

Exhibit 2

<p style="text-align: center;">IN UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF NORTH CAROLINA EASTERN DIVISION Case No. 4:23-CV-00193-D</p> <p>RODNEY D. PIERCE and MOSES) MATTHEWS)) Plaintiffs,)) vs.)) THE NORTH CAROLINA STATE) BOARD OF ELECTIONS, et al.,)) Defendants.)</p> <p style="text-align: center;">The videoconference deposition of SEAN TRENDE, PH.D. taken pursuant to notice before Vincent J. Bailey, Certified Shorthand Reporter, on September 30, 2024, at the hour of 1:25 p.m.</p> <p style="text-align: right;">1</p>	<p style="text-align: center;">I N D E X</p> <p>DEPONENT: SEAN TRENDE, PH.D. PAGE Examination by Ms. Theodore 4</p> <p style="text-align: center;">E X H I B I T S</p> <p>DEPOSITION EXHIBITS MARKED</p> <table><tr><td>Exhibit 1</td><td>10</td></tr><tr><td>Exhibit 2</td><td>35</td></tr><tr><td>Exhibit 3</td><td>41</td></tr><tr><td>Exhibit 4</td><td>46</td></tr><tr><td>Exhibit 5</td><td>57</td></tr><tr><td>Exhibit 6</td><td>67</td></tr><tr><td>Exhibit 7</td><td>72</td></tr><tr><td>Exhibit 8</td><td>74</td></tr><tr><td>Exhibit 9</td><td>79</td></tr><tr><td>Exhibit 10</td><td>81</td></tr><tr><td>Exhibit 11</td><td>94</td></tr><tr><td>Exhibit 12</td><td>98</td></tr><tr><td>Exhibit 13</td><td>166</td></tr><tr><td>Exhibit 5</td><td>179</td></tr><tr><td>Exhibit 14</td><td>204</td></tr><tr><td>Exhibit 15</td><td>219</td></tr></table> <p style="text-align: right;">3</p>	Exhibit 1	10	Exhibit 2	35	Exhibit 3	41	Exhibit 4	46	Exhibit 5	57	Exhibit 6	67	Exhibit 7	72	Exhibit 8	74	Exhibit 9	79	Exhibit 10	81	Exhibit 11	94	Exhibit 12	98	Exhibit 13	166	Exhibit 5	179	Exhibit 14	204	Exhibit 15	219
Exhibit 1	10																																
Exhibit 2	35																																
Exhibit 3	41																																
Exhibit 4	46																																
Exhibit 5	57																																
Exhibit 6	67																																
Exhibit 7	72																																
Exhibit 8	74																																
Exhibit 9	79																																
Exhibit 10	81																																
Exhibit 11	94																																
Exhibit 12	98																																
Exhibit 13	166																																
Exhibit 5	179																																
Exhibit 14	204																																
Exhibit 15	219																																
<p>1 APPEARANCES: 2 Elisabeth S. Theodore - via videoconference 3 Arnold & Porter Kaye Scholer LLP 4 601 Massachusetts Ave. NW 5 Washington, D.C. 20001-3743 6 Elisabeth.theodore@arnoldporter.com 7 appeared on behalf of plaintiffs; 8 Phillip Strach and Jordan Koonts - via videoconference 9 Nelson Mullins 10 301 Hillsborough Street, Suite 1400 11 Raleigh, NC 27603 12 Phil.strach@nelsonmullins.com 13 -and- 14 Erika Prouty - via videoconference 15 Baker Hostetler 16 200 Civic Center Drive, Suite 1200 17 Columbus, OH 43215 18 Eprouty@bakerlaw.com 19 appeared on behalf of defendants. 20 21 22 23 24 25</p> <p style="text-align: right;">2</p>	<p>1 SEAN TRENDE, PH.D., 2 the deponent herein, having first been 3 duly sworn on oath, was examined and 4 testified as follows: 5 EXAMINATION 6 BY MS. THEODORE: 7 Q. All right. Good morning, Dr. Trende. My name 8 is Elisabeth Theodore from the law firm of Arnold & 9 Porter. 10 Can you please state your full name for 11 the record? 12 A. Yeah. It is Sean Patrick Trende, T-r-e-n-d-e. 13 The first name is S-e-a-n. 14 Q. All right. You have been deposed a number of 15 times before. Is that right? 16 A. Yes. 17 Q. Including as a Zoom deposition? 18 A. Yes. 19 Q. All right. There will be a transcript of 20 everything we say, so we should try not to talk over 21 each other, and I'll just ask that you wait until my 22 questions are done before answering. Is that fair? 23 A. I'll do my best, yes. 24 Q. Okay. You understand that if your counsel 25 objects, you still have to answer the question unless</p> <p style="text-align: right;">4</p>																																

<p>1 your counsel specifically instructs you not to answer</p> <p>2 the question?</p> <p>3 A. Yes.</p> <p>4 Q. All right. Is there any reason you couldn't</p> <p>5 give complete, accurate, truthful testimony today?</p> <p>6 A. No.</p> <p>7 Q. All right. If you want to break, just let me</p> <p>8 know, but I just ask that you not ask to take any</p> <p>9 breaks in the middle of a question. Is that fair?</p> <p>10 A. Yes.</p> <p>11 Q. Okay. What did you do to prepare for this</p> <p>12 deposition?</p> <p>13 A. I spoke with counsel. I reviewed my report and</p> <p>14 the reports of, or the rebuttal reports of</p> <p>15 Dr. Collingwood and Mr. Esselstyn.</p> <p>16 Q. Okay. Did you review the opening report of</p> <p>17 Mr. Esselstyn as well?</p> <p>18 A. No.</p> <p>19 Q. Okay. Did you review Dr. Collingwood's opening</p> <p>20 report?</p> <p>21 A. No. I've never read that.</p> <p>22 Q. Okay. Did you review any of Dr. Mattingly's</p> <p>23 reports in preparation of this deposition?</p> <p>24 A. No.</p> <p>25 Q. Okay. Did you review any other documents in</p> <p style="text-align: right;">5</p>	<p>1 A. That's correct.</p> <p>2 Q. Where in North Carolina did you live then?</p> <p>3 A. Durham.</p> <p>4 Q. Okay. Did you ever, have you ever lived in</p> <p>5 North Carolina other than during the period of time</p> <p>6 when you were getting a law degree at Duke?</p> <p>7 A. No.</p> <p>8 Q. Okay. Have you ever lived anywhere else in</p> <p>9 North Carolina besides Durham?</p> <p>10 A. No.</p> <p>11 Q. Have you ever been to any of the counties that</p> <p>12 are included in any of the demonstration districts</p> <p>13 Mr. Esselstyn drew in this case?</p> <p>14 A. I have to look at them to be sure, but, yeah, I</p> <p>15 think so.</p> <p>16 Q. All right. Which of those counties have you</p> <p>17 been to?</p> <p>18 A. Certainly Dare.</p> <p>19 Q. Dare County?</p> <p>20 A. Yes.</p> <p>21 Q. Okay. It is your understanding that Dare</p> <p>22 County is part of the demonstration districts</p> <p>23 Mr. Esselstyn drew in this case?</p> <p>24 A. Yes. I mean, I guess you can define</p> <p>25 demonstration districts and maybe the answer is no,</p> <p style="text-align: right;">7</p>
<p>1 preparation for this deposition?</p> <p>2 A. Not that I remember.</p> <p>3 Q. Okay. Did you speak with anyone besides your</p> <p>4 lawyers in preparation for this deposition?</p> <p>5 A. My wife.</p> <p>6 Q. Okay. Did you bring any documents or notes</p> <p>7 with you to the deposition?</p> <p>8 A. No. I may have a hard copy of my report and</p> <p>9 the two rebuttal reports later, but I don't have any</p> <p>10 documents with me.</p> <p>11 Q. Okay. Do you have anything on your computer</p> <p>12 screen besides the Zoom window?</p> <p>13 A. No.</p> <p>14 Q. All right. You currently live in Ohio. Is</p> <p>15 that right?</p> <p>16 A. Yes.</p> <p>17 Q. How long have you lived there?</p> <p>18 A. Since 2011.</p> <p>19 Q. Okay. Have you lived in North Carolina</p> <p>20 previously?</p> <p>21 A. Yes.</p> <p>22 Q. When was that?</p> <p>23 A. 1998 to 2001.</p> <p>24 Q. That's while you were getting a law degree at</p> <p>25 Duke?</p> <p style="text-align: right;">6</p>	<p>1 but it's part of the area where he was drawing.</p> <p>2 Q. All right. Have you been to Vance County?</p> <p>3 A. Probably. But I'd have to look at the map to</p> <p>4 be sure.</p> <p>5 Q. Okay. Have you been to Henderson?</p> <p>6 A. I'd have to look at the map.</p> <p>7 Q. So sitting here right now, you don't know if</p> <p>8 you've been to Henderson?</p> <p>9 A. No.</p> <p>10 Q. Do you know where Henderson is?</p> <p>11 A. Not exactly off the top of my head, no.</p> <p>12 Q. Is it a county or a city?</p> <p>13 MR. STRACH: Objection.</p> <p>14 A. I think the answer is a city. It might be</p> <p>15 both. I'd have to look at a map.</p> <p>16 Q. Okay. Do you know what county it is in?</p> <p>17 A. No.</p> <p>18 Q. Okay. Have you ever been to Edgecombe or Pitt</p> <p>19 County?</p> <p>20 A. I'd have to look at a street map.</p> <p>21 Q. You'd have to look at a street map? Why is</p> <p>22 that?</p> <p>23 A. Well, because the street map would tell me</p> <p>24 where the roads to the Outer Banks go, which would</p> <p>25 tell me whether I've been to Edgecombe or Pitt County.</p> <p style="text-align: right;">8</p>

<p>1 Q. Got it. Have you ever been to Edgecombe or</p> <p>2 Pitt County other than driving through to go to the</p> <p>3 Outer Banks?</p> <p>4 A. I don't know.</p> <p>5 Q. All right. Do you understand what I mean when</p> <p>6 I refer to the black belt counties?</p> <p>7 A. Yes.</p> <p>8 Q. All right. Other than driving through to go</p> <p>9 somewhere else in North Carolina, have you ever been</p> <p>10 to the black belt counties?</p> <p>11 A. I don't know.</p> <p>12 Q. All right. When were you first approached</p> <p>13 about serving as an expert in this litigation?</p> <p>14 A. Some time before the preliminary injunction</p> <p>15 reports were filed.</p> <p>16 Q. All right. Actually, let me ask you one more</p> <p>17 question. Have you ever been to Elizabeth City?</p> <p>18 A. I don't remember.</p> <p>19 Q. Okay. Do you know what county Elizabeth City</p> <p>20 is in?</p> <p>21 A. I believe it's in Pasquotank, but I'm not sure.</p> <p>22 Q. All right. Do you recall you submitted a</p> <p>23 report at the preliminary injunction stage of this</p> <p>24 case in December of 2023?</p> <p>25 A. Yes.</p> <p style="text-align: right;">9</p>	<p>1 A. Yes.</p> <p>2 Q. All right. Do you recall receiving the reports</p> <p>3 from Mr. Esselstyn and Dr. Mattingly around May 31,</p> <p>4 2024?</p> <p>5 A. That sounds reasonable. I don't remember when</p> <p>6 I got them.</p> <p>7 Q. Okay. When did you begin working on your</p> <p>8 August report in this case?</p> <p>9 A. I probably did some of it around the time I got</p> <p>10 it. We were out of the country for most of June, but</p> <p>11 I believe I wanted to at least familiarize myself with</p> <p>12 them before we left. But I think most of the work was</p> <p>13 done in July.</p> <p>14 Q. Okay. Do you recall approximately how many</p> <p>15 hours you spent preparing the August report?</p> <p>16 A. No.</p> <p>17 Q. Was it less than 50?</p> <p>18 A. I don't know.</p> <p>19 Q. All right. Did anyone other than counsel help</p> <p>20 you in any way with your work on the August expert</p> <p>21 report in this case?</p> <p>22 A. No.</p> <p>23 Q. Okay. Did anyone other than counsel help you</p> <p>24 in any way with your work on the preliminary</p> <p>25 injunction stage expert report in this case?</p> <p style="text-align: right;">11</p>
<p>1 Q. Do you recall how many hours you spent</p> <p>2 preparing the preliminary injunction stage report?</p> <p>3 A. No.</p> <p>4 Q. Do you have a guess?</p> <p>5 A. No.</p> <p>6 Q. All right. You submitted a report on</p> <p>7 August 16, 2024?</p> <p>8 A. That's right.</p> <p>9 Q. All right. I'm going to transmit that and mark</p> <p>10 it as Exhibit 1.</p> <p>11 (Deposition Exhibit No. 1 marked for</p> <p>12 identification.)</p> <p>13 BY MS. THEODORE:</p> <p>14 Q. Do you recognize this document as the expert</p> <p>15 report you submitted in this case in August 2024?</p> <p>16 A. I have to open it, okay.</p> <p>17 Technical assistance, please.</p> <p>18 (Discussion off the record.)</p> <p>19 THE WITNESS: All right.</p> <p>20 Yes. This is the expert report from this</p> <p>21 matter.</p> <p>22 BY MS. THEODORE:</p> <p>23 Q. Okay. Was your assignment for this August 2024</p> <p>24 report to respond to the reports of plaintiffs'</p> <p>25 experts Mr. Esselstyn and Dr. Mattingly?</p> <p style="text-align: right;">10</p>	<p>1 A. No.</p> <p>2 Q. All right. We talked earlier about what you</p> <p>3 did in preparation for this deposition. In general</p> <p>4 have you reviewed the reports of plaintiffs' expert</p> <p>5 Dr. Burch in this case?</p> <p>6 A. Not to prepare for this deposition, but I think</p> <p>7 I might have read it at the PI phase.</p> <p>8 Q. Okay. Do you recall whether you have read her</p> <p>9 reports at the subsequent phase of the case?</p> <p>10 A. I don't believe so. I guess I recall, but I</p> <p>11 don't believe I've read them.</p> <p>12 Q. Okay. You are not expressing any opinion about</p> <p>13 Dr. Burch's work in this case. Is that correct?</p> <p>14 A. I don't know if there's anything that I wrote</p> <p>15 that might indirectly touch on her work, but I</p> <p>16 certainly didn't write it directly in response to her.</p> <p>17 Q. Can you think of anything right now that might</p> <p>18 indirectly touch on her work?</p> <p>19 A. I don't see how I could possibly do that, not</p> <p>20 having read her reports, but no.</p> <p>21 Q. Have you reviewed all of Dr. Collingwood's</p> <p>22 rebuttal report or just parts?</p> <p>23 A. I believe I read the whole thing. I think I</p> <p>24 spent less time on the performance part than what we</p> <p>25 might call the ACS part, but I did look at it.</p> <p style="text-align: right;">12</p>

<p>1 Q. Okay. Did you review Dr. Mattingly's rebuttal 2 report? 3 A. Yes. 4 Q. All right. Have you ever read 5 Dr. Collingwood's opening report? 6 A. No. 7 Q. Okay. Did you review any of Dr. Collingwood's 8 data or code that he used for any of his reports? 9 A. No. 10 Q. You could have done that, right? 11 A. If those documents were produced to counsel, I 12 guess I could have. 13 Q. Okay. You never asked for those, for those 14 documents? 15 A. No. 16 Q. Okay. Other than reviewing the rebuttal 17 reports in this case, have you done any other further 18 work or analysis in this case since receiving the 19 rebuttal reports? 20 A. I mean, other than reviewing the rebuttal 21 reports and evaluating their claims, no. 22 Q. Okay. To evaluate their claims, you didn't do 23 any, perform any additional analysis? 24 A. I mean, if you are evaluating claims you are 25 analyzing them and thinking about them, so I guess in</p> <p style="text-align: right;">13</p>	<p>1 Are there any, for example, are there any expert 2 engagements that aren't listed here? 3 A. I think the only thing I'm required to disclose 4 is where I've testified or been deposed, if I recall 5 correctly. So the last case here is Stone v. Allen. 6 I was deposed in Milligan v. Allen as well. 7 Q. All right. Have you served an expert report in 8 any case that is not listed on this list? 9 A. Yes. 10 Q. What are those cases? 11 A. There is the, what I call the big case in North 12 Carolina. I can't think of the name of it right now, 13 but it is the consolidated case regarding 14 Congressional districts, Senate districts and House 15 districts. 16 Q. Okay. 17 A. Then there have been a number of reports in 18 Nassau County, New York, and two reports in Onondaga 19 County, New York. 20 Q. Okay. When were the Nassau County reports 21 served? 22 A. June and July. 23 Q. What about Onondaga County? 24 A. That I believe was all done in September. 25 Q. What are those cases about?</p> <p style="text-align: right;">15</p>
<p>1 that sense the answer is I did. But in the sense that 2 I think you are using that term, I guess the answer is 3 no. 4 Q. You didn't create any new maps? 5 A. I did not. 6 Q. Okay. You didn't perform any additional data 7 crunching? 8 A. I don't believe I did. 9 Q. You didn't write any additional code? 10 A. I don't think so. 11 Q. All right. 12 A. I assume we are going to spend some quality 13 time with these reports, and if I remember having done 14 something with code I'll let you know. But as I sit 15 here, I don't remember anything. 16 Q. All right. Let's scroll to page 48 of what I 17 marked as Exhibit 1, which is your expert report from 18 August. 19 A. (Witness complies.) 20 Q. Do you see your CV there? 21 A. Yes. 22 Q. Okay. Is this a current accurate copy of your 23 CV? 24 A. I believe so, yes. 25 Q. Are there any updates that you need to make?</p> <p style="text-align: right;">14</p>	<p>1 A. Political gerrymandering at the county 2 legislative level. 3 Q. Okay. They don't include any VRA analysis? 4 A. No. There are VRA claims in Nassau County. I 5 don't know if there's VRA claim in Onondaga or if it 6 is state VRA, John Lewis Voting Rights Act. 7 Q. Okay. Did you analyze VRA issues in those 8 cases? 9 A. There's some engagement in the rebuttal reports 10 with the VRA claims. 11 Q. What was the nature of that engagement? 12 A. I believe it had to do with performance, 13 whether districts performed. There was some 14 ecological inference analysis. Most of the dispute 15 there is which elections are most appropriate for 16 evaluating performance in a county legislative 17 district. So I ran ecological inference on some years 18 that plaintiff's expert did not include. 19 Q. Okay. All right. So other than the other 20 North Carolina case and the Nassau County and Onondaga 21 cases, there aren't any other cases in which you have 22 served as an expert that are not listed in the CV that 23 we have been discussing? 24 A. I don't think that's right. I think I also 25 said Allen v. Milligan.</p> <p style="text-align: right;">16</p>

<p>1 Q. Okay. Other than North Carolina case, Allen 2 versus Milligan, Nassau County and Onondaga, are there 3 any other cases in which you have served as an expert 4 that are not listed on the CV?</p> <p>5 A. Yes. There is also a report in Florida.</p> <p>6 Q. What was that?</p> <p>7 A. Regarding their state -- it is Hodges. It is a 8 14th amendment claim.</p> <p>9 Q. Have you served a report in that case already?</p> <p>10 A. Yes.</p> <p>11 Q. What was the nature of your assignment in 12 Hodges?</p> <p>13 A. It was evaluating demonstration districts or 14 illustrative districts.</p> <p>15 Q. All right. You are currently employed at 16 RealClear Politics. Is that correct?</p> <p>17 A. Yes.</p> <p>18 Q. All right. Let's flip to page 1 of your 19 report?</p> <p>20 A. (Witness complies.)</p> <p>21 Q. You say there that you collaborate in rating 22 the competitiveness of presidential, senate, house and 23 gubernatorial races. Is that correct?</p> <p>24 A. Yes.</p> <p>25 Q. I assume senate and house in that sentence</p> <p style="text-align: right;">17</p>	<p>1 Carolina in 2020 -- sorry, strike that.</p> <p>2 Other than reporting on CVAP in North 3 Carolina using data from the Census Bureau in 2020 and 4 2022, does your expert report include any analysis of 5 demographic trends in this country?</p> <p>6 A. Not that I can remember.</p> <p>7 Q. Okay. Does your expert report in this case 8 include any analysis of exit poll data?</p> <p>9 A. No.</p> <p>10 Q. Does your expert report in this case include 11 any analysis of public opinion polling?</p> <p>12 A. No.</p> <p>13 Q. Does your expert report in this case include 14 any analysis of voter turnout?</p> <p>15 A. I don't believe so.</p> <p>16 Q. Does your expert report in this case include 17 any analysis of voting behavior?</p> <p>18 A. No.</p> <p>19 Q. All right. Have you ever published anything 20 that relates to North Carolina?</p> <p>21 A. What do you mean by published?</p> <p>22 Q. Well, how do you understand the term published?</p> <p>23 A. Well, from the point of view of academia, that 24 usually means publishing in a peer reviewed journal. 25 From the point of view of, say, my</p> <p style="text-align: right;">19</p>
<p>1 refer to the U.S. Senate and U.S. House?</p> <p>2 A. That's right.</p> <p>3 Q. Does your job at RealClear Politics involve any 4 analysis of state senate races?</p> <p>5 A. Not typically.</p> <p>6 Q. State house races?</p> <p>7 A. Not typically.</p> <p>8 Q. Have you ever analyzed any North Carolina state 9 senate races for your job at RealClear Politics?</p> <p>10 A. Not that I can remember.</p> <p>11 Q. Okay. You say that in carrying out your 12 responsibilities at RealClear Politics, "I have 13 studied and written extensively about demographic 14 trends in the country, exit poll data at the state and 15 federal, public opinion polling, voter turnout and 16 voting behavior."</p> <p>17 Did I read that right?</p> <p>18 A. Yes.</p> <p>19 Q. Okay. Your expert report in this case does not 20 include any analysis of demographic trends in this 21 country. Is that correct?</p> <p>22 A. I don't know about that. We are looking at the 23 trends in CVAP in northeastern North Carolina. So I 24 don't know that I would completely disclaim that.</p> <p>25 Q. Okay. So other than reporting on CVAP in North</p> <p style="text-align: right;">18</p>	<p>1 RealClear Politics job, it will mean writing stuff for 2 RealClear Politics or for AI or any other number of 3 places.</p> <p>4 Q. All right. Have you ever written any articles 5 in any context relating specifically to North 6 Carolina?</p> <p>7 A. Yes.</p> <p>8 Q. Okay. What is the topic of those articles?</p> <p>9 A. I did the North Carolina chapters for the 10 Almanac of American Politics in 2014.</p> <p>11 Q. Okay.</p> <p>12 A. Analysis of North Carolina was included in my 13 book. And I'm sure I've analyzed senate races and 14 congressional races in North Carolina over the course 15 of the past decade and a half.</p> <p>16 Q. You are referring to the United States Senate 17 races?</p> <p>18 A. Yes.</p> <p>19 Q. Okay. What did you talk about in your book 20 with respect to North Carolina?</p> <p>21 A. Well, the book is over 200 page book, so I 22 don't remember every citation or usage there, but it 23 was talking about the development of political trends 24 across the country, and North Carolina was part of 25 that.</p> <p style="text-align: right;">20</p>

<p>1 Q. Does the book cover -- when was the book 2 published?</p> <p>3 A. I believe it was published in 2012.</p> <p>4 Q. So it doesn't cover any trend in North Carolina 5 over the last decade. Is that right?</p> <p>6 A. That's right.</p> <p>7 Q. Okay. So your dissertation was entitled 8 "Application of Spatial Analysis to Contemporary 9 Problems in Political Science." Is that right?</p> <p>10 A. I think that's right.</p> <p>11 Q. Was that published in any peer-reviewed 12 journal?</p> <p>13 A. No.</p> <p>14 Q. Did you ever try to get the dissertation 15 published?</p> <p>16 A. Oh, no.</p> <p>17 Q. Okay. So on page 2 of your report you describe 18 three chapters in the dissertation, and the second 19 chapter you describe as involving the "application of 20 integrated nested Laplace approximations to enable the 21 incorporation of spatial statistical analysis in the 22 study of U.S. elections." Is that right?</p> <p>23 A. Yes.</p> <p>24 Q. Can you explain what that means?</p> <p>25 A. Yes. So traditionally in the study of</p> <p style="text-align: right;">21</p>	<p>1 Q. What traditional effects disappeared?</p> <p>2 A. So there's a long-standing body of research on 3 ballot order effect, finding whoever is listed first 4 on the ballot tends to get a bonus, if you will, on 5 their vote share, but when you run it on -- when you 6 run it in a spatial model, at least in Arizona, that 7 effect disappears.</p> <p>8 Q. Okay. Did your dissertation discuss North 9 Carolina at all?</p> <p>10 A. I don't believe so. If it did, it was in 11 passing.</p> <p>12 Q. Have you ever published any peer reviewed 13 academic work?</p> <p>14 A. Yes.</p> <p>15 Q. What work have you published that's peer 16 reviewed?</p> <p>17 A. It is listed on my CV. Let me pull that up. 18 It's the joint article from 2022, 19 "Reconsidering Bellwether Locations in U.S. 20 Presidential Elections."</p> <p>21 Q. I see. Okay. Does that article discuss the 22 Voting Rights Act?</p> <p>23 A. If it does, it is only in passing. 24 I don't remember any instances of it.</p> <p>25 Q. Okay. So to your knowledge, you have never</p> <p style="text-align: right;">23</p>
<p>1 elections you have had aerial units like precincts or 2 counties, even states, that have been the basis of the 3 analysis and people will run their regression analyses 4 with these units as, you know, the for lack of better 5 word the cluster of the relevant data. When you do 6 that, you treat the units as if they were independent 7 of each other.</p> <p>8 Well, that's a big assumption, because we 9 know that precincts and counties and even states 10 aren't truly independent of each other. Knowing one 11 thing about one county or one precinct will typically 12 give you analysis or give you insight into what the 13 relevant values are for adjacent or nearby precincts.</p> <p>14 And so one of the reasons that this hasn't 15 been taken into account is that running, writing the 16 code to take account of this statistical 17 interdependence in JADS, which is the traditional 18 Bayesian programming language is cumbersome, can take 19 a long time.</p> <p>20 So there is a newer approach, which rather 21 than restating it, I'll just call by its acronym INLA, 22 that does it quickly. So it explored the application 23 of INLA to the study of elections and with a couple of 24 case studies noted that when you did so some of the 25 traditional effects that have been found disappear.</p> <p style="text-align: right;">22</p>	<p>1 published any academic work about the Voting Rights 2 Act?</p> <p>3 A. Not -- to my knowledge, that's correct.</p> <p>4 Q. Okay. Have you ever published any academic 5 work about the use of citizen voting age population 6 data?</p> <p>7 A. I don't believe so.</p> <p>8 Q. Have you ever published any academic work about 9 minority politics for voting behavior?</p> <p>10 A. I don't believe so.</p> <p>11 By the way, for the record, I have a hard 12 copy of my report in front of me now.</p> <p>13 Q. Okay. Great.</p> <p>14 Do you consider yourself to be an expert 15 on minority politics or minority voting behavior?</p> <p>16 A. That's one of those questions that brings in a 17 legal angle to it. And to the extent that the legal 18 test is, you know, higher -- for an expert 19 qualification is, you know, basically greater than a 20 lay witness, then I suppose that's true.</p> <p>21 But to the extent that there's a 22 subdiscipline of political science that's race and 23 ethnicity studies, then, no, I wouldn't in that sense.</p> <p>24 I guess the way to answer that is that 25 I'll interpose my own objection to the extent it calls</p> <p style="text-align: right;">24</p>

<p>1 for a legal conclusion, but to the extent you are</p> <p>2 asking about something in terms of political science</p> <p>3 discipline, the answer would be no.</p> <p>4 Q. Have minority politics or voting behaviors been</p> <p>5 the subject of any of your academic work?</p> <p>6 A. I think it was related to the communities of</p> <p>7 interest article in my dissertation when we were</p> <p>8 looking at different ways to define communities of</p> <p>9 interest -- I guess that's not published so, no. In</p> <p>10 peer reviewed, literature, no.</p> <p>11 Q. What fields of expertise do you believe you</p> <p>12 have that are germane to the topics addressed in your</p> <p>13 report in this case?</p> <p>14 A. Well, I have considerable experience testifying</p> <p>15 on the Voting Rights Act. I teach it in my class. I</p> <p>16 teach minority politics and voting behavior in my</p> <p>17 class. I write about it extensively in my work.</p> <p>18 I've drawn demonstration districts</p> <p>19 previously. I've drawn real districts previously in</p> <p>20 states that have involved the Voting Rights Act. I've</p> <p>21 been an advisor to counsel with respect to Voting</p> <p>22 Rights Act.</p> <p>23 That's all I can think of off the top of</p> <p>24 my head.</p> <p>25 Q. All right. Do you consider yourself an expert</p> <p style="text-align: right;">25</p>	<p>1 black belt. Those are the first two cases listed</p> <p>2 here.</p> <p>3 Common Cause v. Rucho.</p> <p>4 Q. Okay.</p> <p>5 A. I think that was a part of NCLCV v. Hall, but I</p> <p>6 wasn't deeply involved in that case.</p> <p>7 Q. All right.</p> <p>8 A. I think that's it.</p> <p>9 Q. Okay. Do you consider yourself an expert in</p> <p>10 the use of Census Bureau data?</p> <p>11 A. Yes. That doesn't mean you know everything</p> <p>12 about it, but I would say I'm an expert in it.</p> <p>13 Q. What's the basis for that expertise?</p> <p>14 A. I mean, it's been crucial to my work for over a</p> <p>15 decade now.</p> <p>16 Q. Okay.</p> <p>17 A. I use ACS data in my dissertation.</p> <p>18 Q. All right. Has your testimony or expert report</p> <p>19 ever been excluded by a court?</p> <p>20 A. Yes.</p> <p>21 Q. Which cases?</p> <p>22 A. I think the only one it was ever excluded was</p> <p>23 the Fair Fight Action versus Raffensperger case.</p> <p>24 Q. Is it fair to say that many other courts have</p> <p>25 declined to credit your testimony?</p> <p style="text-align: right;">27</p>
<p>1 in North Carolina communities of interest?</p> <p>2 A. I don't know about that.</p> <p>3 Q. Do you consider yourself to be an expert in</p> <p>4 North Carolina's political geography?</p> <p>5 A. Yes.</p> <p>6 Q. What's the basis for your expertise in North</p> <p>7 Carolina's political geography?</p> <p>8 A. Well, I've been testifying in North Carolina</p> <p>9 cases regarding their politics and political geography</p> <p>10 for about a decade now. North Carolina has been a</p> <p>11 competitive state for call it 15 years at the</p> <p>12 presidential level, longer than that at the Senate</p> <p>13 level, so understanding various political coalitions</p> <p>14 in North Carolina is certainly crucial to being able</p> <p>15 to understand how a Senate race is likely to go or to</p> <p>16 interpret cross tabs in those races. Those are some</p> <p>17 examples.</p> <p>18 Q. Okay. Have you ever been an expert in a case</p> <p>19 involving North Carolina that focused on the black</p> <p>20 belt region?</p> <p>21 A. Yes.</p> <p>22 Q. What case was that?</p> <p>23 A. Well, Dickson v. Rucho and Covington -- now we</p> <p>24 are going back a decade, so I may misremember, but I</p> <p>25 believe they involve legislative districts in the</p> <p style="text-align: right;">26</p>	<p>1 A. That's certainly happened.</p> <p>2 Q. Have you ever been an expert on behalf of a</p> <p>3 plaintiff in a Section 2 case?</p> <p>4 A. Yes.</p> <p>5 Q. Which cases?</p> <p>6 A. One that comes to mind is the Michigan case.</p> <p>7 Q. Agee versus Benson?</p> <p>8 A. Yes.</p> <p>9 Q. Okay. Any others?</p> <p>10 A. I don't believe so.</p> <p>11 Q. All right. Have you ever served as an expert</p> <p>12 on behalf of a government entity contending that the</p> <p>13 government entity was justified in creating a majority</p> <p>14 minority district or a minority opportunity district?</p> <p>15 MR. STRACH: Objection. Can you repeat</p> <p>16 it?</p> <p>17 Q. Sure. Have you ever served as an expert on</p> <p>18 behalf of a government entity, contending that the</p> <p>19 government entity was justified in creating a majority</p> <p>20 minority district or a minority opportunity district?</p> <p>21 MR. STRACH: Objection.</p> <p>22 Go ahead.</p> <p>23 A. I don't know. Certainly in the Nairne case in</p> <p>24 Louisiana there were examples of districts in my</p> <p>25 report where I thought that there was a sufficiently</p> <p style="text-align: right;">28</p>

<p>1 compact minority group that we would have no objection</p> <p>2 to the demonstration districts drawn by their expert.</p> <p>3 So I guess in that, but I never did the full -- I</p> <p>4 didn't do Gingles.</p> <p>5 Q. Okay. Have you ever taken a position as part</p> <p>6 of any expert work or any consulting work that a VRA</p> <p>7 district was required in a particular instance?</p> <p>8 MR. STRACH: Objection.</p> <p>9 Go ahead.</p> <p>10 A. Was it required? I don't know that I've ever</p> <p>11 taken that position directly. But there's certainly</p> <p>12 claims to that effect that I have not contested. The</p> <p>13 work as the Voting Rights Act expert -- well, I don't</p> <p>14 know about that. There were certainly cases where I</p> <p>15 wouldn't have objected to it, but I can't think of any</p> <p>16 off the top of my head.</p> <p>17 I guess the only way as a defendant for</p> <p>18 state you would do that would be if you were offering</p> <p>19 that as a defense to a 14th amendment claim. I don't</p> <p>20 think I've ever done that, but I'm not sure.</p> <p>21 Q. Okay. You primarily work as an expert for</p> <p>22 defendants, correct?</p> <p>23 A. I think that's right.</p> <p>24 Q. Okay. Other than in Nairne, have you ever come</p> <p>25 to the conclusion in your work as an expert that</p> <p style="text-align: right;">29</p>	<p>1 Q. Okay. All right. Which of the cases that are</p> <p>2 listed in this CV have involved -- let me ask it this</p> <p>3 way. Can you identify the cases that are listed on</p> <p>4 this CV in which you engaged in analysis of Gingles 1?</p> <p>5 A. I can do my best.</p> <p>6 I can't remember if we did in Carter v.</p> <p>7 Chapman.</p> <p>8 LULAC v. Abbott.</p> <p>9 Moore v. Lee.</p> <p>10 Agee v. Benson.</p> <p>11 Coca v. City of Dodge City.</p> <p>12 Milligan v. Allen.</p> <p>13 Nairne v. Ardoin.</p> <p>14 Robin -- well, I don't remember Robinson</p> <p>15 v. Ardoin.</p> <p>16 Stone v. Allen.</p> <p>17 Q. Okay. All right. Let's turn to your opinions</p> <p>18 in this case. You wrote code for purposes of the</p> <p>19 report, your August report. Is that right?</p> <p>20 A. That's right.</p> <p>21 Q. Has any of that code been peer reviewed?</p> <p>22 A. No.</p> <p>23 Q. All right. What computer program or software</p> <p>24 did you use when you were working on your report?</p> <p>25 A. R. Just the letter R.</p> <p style="text-align: right;">31</p>
<p>1 Gingles 1 was satisfied?</p> <p>2 MR. STRACH: Objection.</p> <p>3 A. Yeah, I don't know the answer to that,</p> <p>4 primarily because there may be instances where I came</p> <p>5 to that conclusion, but it wasn't in a report and so</p> <p>6 didn't become a subject of testimony.</p> <p>7 I can't remember. Some examples of where,</p> <p>8 I know that in the Lamone case, there were places</p> <p>9 where we froze three of the Congressional districts in</p> <p>10 Maryland because of VRA issues. I can't remember if</p> <p>11 we concluded that they were fully required or if they,</p> <p>12 we were just doing it arguendo.</p> <p>13 I certainly thought, but I didn't -- well,</p> <p>14 yeah, I came to the conclusion in LULAC v. Abbott</p> <p>15 there were required VRA districts, but then the</p> <p>16 Galveston County case I'm not sure that's true any</p> <p>17 more.</p> <p>18 Oh, yeah, in the Moore v. Lee case in</p> <p>19 Tennessee, I came to the conclusion that there was a</p> <p>20 VRA required district.</p> <p>21 Obviously as a plaintiff in Agee v.</p> <p>22 Benson, I thought there were a lot of VRA required</p> <p>23 districts.</p> <p>24 Talked about Nairne.</p> <p>25 Yeah, that's all I can think of.</p> <p style="text-align: right;">30</p>	<p>1 Q. Is that the only one?</p> <p>2 A. Oh, yeah. So Dr. Mattingly's stuff is in</p> <p>3 Python.</p> <p>4 Q. Anything else?</p> <p>5 A. I think that's it.</p> <p>6 Q. Okay. Did you use any redistricting software</p> <p>7 or platform as part of your work?</p> <p>8 A. I might have looked at stuff in Dave's</p> <p>9 Redistricting, but I don't remember.</p> <p>10 Q. What would you have looked at in Dave's</p> <p>11 Redistricting?</p> <p>12 A. Well, you can look at maps that way.</p> <p>13 Q. Right. What maps did you look at in Dave's</p> <p>14 Redistricting?</p> <p>15 A. Well, I think I looked at demonstration</p> <p>16 districts that had been proposed, but I'm not sure.</p> <p>17 Q. Okay.</p> <p>18 (Recess taken.)</p> <p>19 BY MS. THEODORE:</p> <p>20 Q. All right. Dr. Trende, did you draw any</p> <p>21 districts as part of your work for this case?</p> <p>22 A. I don't believe so.</p> <p>23 Q. Okay. Did you attempt any adjustments of</p> <p>24 Mr. Esselstyn's district configurations for any of</p> <p>25 your work in this case?</p> <p style="text-align: right;">32</p>

<p>1 A. I don't remember doing that.</p> <p>2 Q. Okay.</p> <p>3 A. If we go through the report and I remember</p> <p>4 doing it, I'll let you know, but I really don't.</p> <p>5 Q. Okay. So you don't, right now you don't</p> <p>6 remember attempting to draw any alternative district</p> <p>7 configurations for this case?</p> <p>8 A. Not as I sit here, no.</p> <p>9 Q. Okay. All right. I'm going to refer to</p> <p>10 citizen voting age population data as CVAP data. Is</p> <p>11 that fair?</p> <p>12 A. Yes.</p> <p>13 Q. All right. You have previously used CVAP data</p> <p>14 to calculate the minority population of a potential</p> <p>15 majority minority district in your work as an expert.</p> <p>16 Is that right?</p> <p>17 A. Yes.</p> <p>18 Q. Okay. Are you aware of any CVAP data that is</p> <p>19 more reliable than the data produced by the Census</p> <p>20 Bureau in the American Communities Survey?</p> <p>21 A. No.</p> <p>22 Q. Are you aware of any CVAP data that is</p> <p>23 available other than the data produced by Census</p> <p>24 Bureau in the American Communities Survey?</p> <p>25 A. No. There was an attempt to get an actual</p> <p style="text-align: right;">33</p>	<p>1 If you did a count, you could find the true number of</p> <p>2 black citizens of voting age population and all</p> <p>3 citizens of voting age population, correct?</p> <p>4 MR. STRACH: Objection.</p> <p>5 Go ahead.</p> <p>6 A. Yes. If there had been a citizenship question</p> <p>7 on the Census, we would know the true count of black</p> <p>8 citizens in these districts, at least as of 2020.</p> <p>9 Q. Right. So I'm asking you would it surprise you</p> <p>10 to learn that the black citizen voting age population</p> <p>11 percentage in a particular region is higher than the</p> <p>12 black voting age population in a particular region?</p> <p>13 MR. STRACH: Objection.</p> <p>14 Answer again.</p> <p>15 A. Yeah. I mean, the answer, if you are taking</p> <p>16 away variability from the Census data or the ACS data,</p> <p>17 the answer is I wouldn't be surprised either way.</p> <p>18 MS. THEODORE: I'm going to mark this</p> <p>19 document as Exhibit 2.</p> <p>20 (Deposition Exhibit No. 2 marked for</p> <p>21 identification.)</p> <p>22 BY MS. THEODORE:</p> <p>23 Q. Dr. Trende, do you recognize this as a memo you</p> <p>24 wrote in December --</p> <p>25 A. Hold on, please. I need to -- I have the old</p> <p style="text-align: right;">35</p>
<p>1 citizenship question on the Census that failed, in</p> <p>2 which case we wouldn't have this headache. So, no. I</p> <p>3 think the ACS is it.</p> <p>4 Q. Okay. Would it surprise you to learn that the</p> <p>5 black CVAP percentage in a particular region is</p> <p>6 greater than the black voting age population</p> <p>7 percentage?</p> <p>8 A. I mean, no. There's error markings involved</p> <p>9 with the data, it is just a sample. So it could be</p> <p>10 zero when the VAP is 95 percent. That's just the</p> <p>11 vagaries of sampling.</p> <p>12 Q. I'm not sure I understood your answer. I'm</p> <p>13 asking -- I'm not asking about any particular sample.</p> <p>14 I'm just asking would it surprise you to learn that</p> <p>15 the black CVAP percentage in a particular region is</p> <p>16 greater than the black voting age population</p> <p>17 percentage?</p> <p>18 A. No. I understood your question. My response</p> <p>19 is it doesn't or it wouldn't, because the CVAP we have</p> <p>20 is a sample, which means that there's quite a lot of</p> <p>21 variety that we might get compared to the actual VAP</p> <p>22 population or compared to the actual citizen voting</p> <p>23 age population, for that matter.</p> <p>24 Q. I'm asking you about the actual citizen voting</p> <p>25 age population. You agree that there's a true number.</p> <p style="text-align: right;">34</p>	<p>1 document up. Now I've got to get this document,</p> <p>2 download it.</p> <p>3 Okay. The Bernie memo.</p> <p>4 Q. Do you recognize this as a memo that you wrote</p> <p>5 in 2021 relating to Virginia's redistricting plans?</p> <p>6 A. Yes. I co-wrote this with Bernie Grofman.</p> <p>7 Q. Can you turn to page 8, please?</p> <p>8 A. (Witness complies.)</p> <p>9 Okay.</p> <p>10 Q. All right. Do you see you say that "the</p> <p>11 presence of non-citizen Latinos and Asian Americans in</p> <p>12 a district can raise the black CVAP share above the</p> <p>13 black VAP share making it a useful metric for</p> <p>14 assessing a district's actual electorate"?</p> <p>15 Did I read that correctly?</p> <p>16 A. Yes.</p> <p>17 Q. Okay. You agree with that?</p> <p>18 A. Yes, it is possible.</p> <p>19 Like I said, it wouldn't surprise me</p> <p>20 either way if you gave me the actual CVAP number and</p> <p>21 it was higher or lower.</p> <p>22 Q. Are you aware of whether the response date for</p> <p>23 an American Community Survey data collection in 2020</p> <p>24 was lower than normal as a consequence of the Covid 19</p> <p>25 pandemic?</p> <p style="text-align: right;">36</p>

<p>1 A. I don't know whether it was higher or lower. I 2 know the 2020 ACS data, I think they even have a 3 disclaimer out on it -- 4 Q. Okay. 5 A. -- "they" being the Census Bureau. 6 Q. You yourself have relied on CVAP data from the 7 ACS that includes responses from 2020 in prior expert 8 reports, correct? 9 A. Yeah. I don't think the CVAP is, on its -- I 10 don't think the ACS data is on its own terms 11 unreliable. It just has error markings. 12 Q. Okay. Do you recall, have you ever included a 13 disclaimer about collection issues for the 2020 14 collection in any of your prior expert reports? 15 MR. STRACH: Objection. 16 Go ahead. 17 A. No. I mean, this report we are using 2019 ACS 18 data. I don't recall putting -- I think in the 19 Stone case in the expert report there, whether or not 20 I think that was directly raised, but, you know, 21 maybe -- I'm assuming you have some other reports to 22 walk through, so maybe we can address this 23 specifically as we get there. 24 Q. I'm asking you right now, do you recall in any 25 report where you have used ACS data from 2020</p> <p style="text-align: right;">37</p>	<p>1 Q. If both of those things are true, then the 2 response bias in ACS responses would result in 3 estimates that the black population there are likely 4 to be lower than the true number. Is that correct? 5 MR. STRACH: Objection. 6 Go ahead. 7 A. If that is the only source of error and 8 response bias in ACS, then that would be the case. If 9 your assumption is true and if it is the only source 10 of response bias. Of course, there would still be 11 sampling error involved. 12 Q. All right. When you say if that were the only 13 source of response bias, are you suggesting that that 14 bias might be cancelled out by some other source of 15 response bias that would make the black population 16 likely to be oversampled? 17 MR. STRACH: Objection. 18 Go ahead. 19 A. No. I'm saying, you've given me a set of 20 assumptions to operate under. I can answer the 21 question under that set of assumptions, as long as we 22 are clear that those are the only set of assumptions 23 that I've been given. Then the answer to your 24 question is yes. 25 But if there's any other sources of</p> <p style="text-align: right;">39</p>
<p>1 including a disclaimer relating to the response rate 2 for ACS data collection in 2020? 3 A. Yes. 4 Q. Which cases? 5 A. Stone case. 6 Q. Okay. What did you say in that disclaimer? 7 A. I said that there were issues with the 2020 ACS 8 data and that the Census Bureau had put out a warning 9 on using those data. 10 Q. Are you aware of whether higher socioeconomic 11 status households became more likely to respond to the 12 ACS during the pandemic? 13 A. I don't know. 14 Q. Okay. Are higher socioeconomic status 15 households in the northeastern region of North 16 Carolina more likely to be white or black? 17 A. As a generalization, black -- I'm sorry, white. 18 Q. Okay. So I want you to assume with me that 19 higher socioeconomic status households became 20 relatively more likely to respond to the ACS during 21 the pandemic and that those households are more likely 22 to be white than black. Are you with me so far? 23 A. Okay. 24 MR. STRACH: Objection. 25 Go ahead.</p> <p style="text-align: right;">38</p>	<p>1 response bias, then I can't answer it as clearly. 2 This transcript is going to follow me for the rest of 3 my life, as I've learned, so I want to be as clear 4 about what it is I'm admitting and what I'm not as 5 possible. 6 Q. Okay. Sitting here right now are you aware of 7 any source of response bias for the ACS data 8 collection from 2020 that resulted in oversampling of 9 black households? 10 MR. STRACH: Objection. 11 Go ahead. 12 A. No. 13 Q. Okay. Would you agree that it is common for 14 experts in VRA cases to use CVAP data from American 15 Community Survey that is disaggregated down to the 16 block level? 17 A. Sure. 18 Q. You've done that before yourself, correct? 19 A. Yes. 20 Q. Okay. Have you relied on a redistricting data 21 hub in your work as an expert? 22 A. Yes. 23 Q. You agree that it is a reliable source for 24 redistricting data? 25 A. It's a reliable source for redistricting data.</p> <p style="text-align: right;">40</p>

<p>1 They have their methods for doing things that have 2 their own drawbacks or shortcomings you should make 3 yourself aware of. And what they do to disaggregate 4 it isn't that different from what I would do in other 5 areas. It's not that they have magically cured the 6 problems that come with disaggregating down to the 7 block group, but they do a good job and on its own 8 terms it does what it says it does. 9 Q. Right. You are not aware of any mistakes or 10 errors in the methodology that the redistricting data 11 hub uses to disaggregate CVAP data down to the block 12 level, are you? 13 MR. STRACH: Objection. 14 A. I'm not aware of any errors in the way they 15 carry out the methodology. I think it does exactly 16 what they say it does. That doesn't mean that the 17 methodology doesn't have its limitations or drawbacks. 18 Q. Okay. 19 MS. THEODORE: All right. I'm going to 20 transmit what I'm going to mark I believe as 21 Exhibit 3. 22 (Deposition Exhibit No. 3 marked for 23 identification.) 24 BY MS. THEODORE: 25 Q. Let me know when you have it open?</p> <p style="text-align: right;">41</p>	<p>1 transcript? 2 A. (Witness complies.) 3 Okay. 4 Q. All right. You see you are discussing there 5 the alternative remedial district that you drew? 6 A. Okay. I haven't looked at this transcript in a 7 long time, but okay. 8 Q. Is that right? 9 A. Can you repeat the question? 10 Q. Yeah. Are you discussing on this page of the 11 transcript the alternative remedial district that you 12 drew? 13 A. Yes. 14 Q. Okay. In drawing that district, I'm looking at 15 lines 17 through 19, you treated it as a requirement 16 that your remedial district have a Hispanic citizen 17 voting age population over 50 percent. Is that 18 correct? 19 A. Yes. That's what counsel wanted. 20 Q. That's what you did? 21 A. Yeah. I don't think there's a legal 22 requirement for it, but counsel wanted the number to 23 be above 50 percent, so I said, okay, I can do that. 24 Q. Okay. So you were presenting remedial 25 districts to the court that in your review had a</p> <p style="text-align: right;">43</p>
<p>1 A. Okay. 2 Q. All right. Do you recognize this as a 3 transcript of an evidentiary hearing in a case called 4 Soto Palmer versus Hobbs in the Western District of 5 Washington? 6 A. Yes. 7 Q. This was held on March 8, 2024? 8 A. That's right. 9 Q. You testified in this hearing? 10 A. Yes. 11 Q. Okay. Is this a case in which the Court found 12 that Washington State's legislative plans diluted 13 Latino voting power in violation of Section 2 of the 14 VRA? 15 A. Yeah. I wasn't involved in the merits phase, 16 but that's my understanding. 17 Q. Okay. You were brought in as an expert at the 18 remedial stage for the defendants? 19 A. That's right. 20 Q. All right. Then you evaluated potential 21 remedial districts and also drew a potential 22 alternative remedial district yourself. Is that 23 correct? 24 A. Yeah. That's right. 25 Q. Okay. Can you turn to page 87 of this</p> <p style="text-align: right;">42</p>	<p>1 Hispanic CVAP population of above 50 percent, correct? 2 A. That's what the point estimate was, sure. 3 We are well past Gingles 1 at this point, 4 so the 50 percent line doesn't really carry legal 5 significance. Counsel wanted me to get the point 6 estimate above 50, so I did that. 7 Q. Okay. You were asked in this case and you 8 didn't produce any maps to the court with a Hispanic 9 CVAP population of less than 50 percent, right? You 10 said that's correct? 11 A. That's right. The point estimates were all 12 above 50 percent. Again, I don't think there's 13 anything wrong with using ACS or CVAP data. 14 Where it becomes a problem is where 15 there's a legally imposed 50 percent plus 1. I mean, 16 if defendants in these cases, who sometimes say that 17 Bartlett v. Strickland required remedial districts to 18 be 50 percent plus 1, are correct, and the Cooper v. 19 Harris view of things is not right, well, then at the 20 remedial phase 50 percent plus 1 threshold becomes 21 more important. But where I was at the time it didn't 22 have the legal significance. It is just what counsel 23 had asked me to do. 24 Q. Dr. Trende, you represented to the Court that 25 your districts had a Hispanic citizen voting age</p> <p style="text-align: right;">44</p>

<p>1 population above 50 percent. Isn't that right true?</p> <p>2 A. I was asked whether my districts had a CVAP</p> <p>3 above 50 percent plus 1 at the remedial phase in a</p> <p>4 case where the CVAP had been used throughout. So I</p> <p>5 think that was truthful testimony in the context of</p> <p>6 the case.</p> <p>7 Q. I'm just asking a very simple question. You</p> <p>8 represented to the Court that your remedial district</p> <p>9 had a Hispanic CVAP population above 50 percent.</p> <p>10 Isn't that true?</p> <p>11 MR. STRACH: Objection.</p> <p>12 Answer again.</p> <p>13 A. Yeah, I'll answer it again. The testimony</p> <p>14 there is that the districts were above 50 percent plus</p> <p>15 1, but it comes in a remedial phase where we are well</p> <p>16 past any Gingles 1 concerns.</p> <p>17 The CVAP data had been used throughout the</p> <p>18 case, it's a little bit late to raise a collateral</p> <p>19 attack on the CVAP data at the remedial phase. So I</p> <p>20 used the point estimate, and the point estimates in</p> <p>21 those districts are above 50 percent plus 1.</p> <p>22 Q. Okay. And do you use the term "point estimate"</p> <p>23 on this page of the transcript?</p> <p>24 A. No.</p> <p>25 Q. Okay. I'm going to mark Exhibit 4.</p> <p style="text-align: right;">45</p>	<p>1 right?</p> <p>2 A. Yes.</p> <p>3 Q. Then you stated, even though this was your</p> <p>4 goal, in your view racial considerations did not</p> <p>5 predominate because you also considered minimizing</p> <p>6 county and jurisdictional splits. Is that a fair</p> <p>7 characterization of what you are saying here?</p> <p>8 A. I think what it says is that it was a goal to</p> <p>9 draw majority minority district, but I didn't let</p> <p>10 these concerns predominate prioritizing traditional</p> <p>11 principles of minimizing county and jurisdictional</p> <p>12 splits, respecting communities of interest, including</p> <p>13 the requests of the Yakama Nation and drawing</p> <p>14 reasonably compact contiguous districts.</p> <p>15 Q. Okay. You further state: "It is likely</p> <p>16 possible to draw a district with a higher HCVAP or</p> <p>17 Democratic performance by allowing race or politics to</p> <p>18 predominate over these concerns. These maps were</p> <p>19 excluded from consideration."</p> <p>20 Is that accurate?</p> <p>21 A. Yes.</p> <p>22 Q. Okay. Is what you are saying there that the</p> <p>23 likely existence of maps that had a higher HCVAP was</p> <p>24 evidence that racial concerns were not predominating</p> <p>25 in your map drawn?</p> <p style="text-align: right;">47</p>
<p>1 (Deposition Exhibit No. 4 marked for</p> <p>2 identification.)</p> <p>3 BY MS. THEODORE:</p> <p>4 Q. Let me know when you have it open?</p> <p>5 A. Okay.</p> <p>6 Q. Do you recognize this as a supplemental expert</p> <p>7 report you filed on February 23, 2024, in the Soto</p> <p>8 Palmer case?</p> <p>9 A. Yes.</p> <p>10 Q. All right. This is the report in which you</p> <p>11 drew an alternative remedial district for the state</p> <p>12 legislature in Washington?</p> <p>13 A. Yes.</p> <p>14 Q. Okay. You use the term minority majority</p> <p>15 district in this report. Is that the same as a</p> <p>16 majority minority district?</p> <p>17 A. I don't know where I picked it up the opposite</p> <p>18 way around, but I do that.</p> <p>19 Q. Okay. So minority majority, you're not</p> <p>20 intending that to mean anything different than</p> <p>21 majority minority?</p> <p>22 A. That's right.</p> <p>23 Q. Okay. Let's go to page 2. You say on page 2,</p> <p>24 I'm in the methodology paragraph, that your goal was</p> <p>25 to create a minority majority district. Is that</p> <p style="text-align: right;">46</p>	<p>1 MR. STRACH: Objection.</p> <p>2 Go ahead.</p> <p>3 A. No.</p> <p>4 Q. Okay. So what are you saying there?</p> <p>5 A. I'm saying that I could have drawn a higher</p> <p>6 HCVAP or democratic performance map if I had allowed</p> <p>7 race or politics to predominate, but I didn't include</p> <p>8 those.</p> <p>9 Q. You are citing the fact that you didn't include</p> <p>10 those as evidence that you did not allow race or</p> <p>11 politics to predominate. Is that correct?</p> <p>12 A. Maybe I do that elsewhere, I don't know. I</p> <p>13 don't remember doing that. But in this sentence all</p> <p>14 it says is it's possible, it's probably possible to</p> <p>15 draw a district with a higher HCVAP or Democratic</p> <p>16 performance by allowing race or politics to</p> <p>17 predominate over these concerns. I didn't include</p> <p>18 those maps or consider them.</p> <p>19 Q. What is the point you were trying to make with</p> <p>20 this sentence, Dr. Trende?</p> <p>21 MR. STRACH: Objection.</p> <p>22 Go ahead.</p> <p>23 A. Well, this was six months ago, so I don't</p> <p>24 remember the exact point being made by the sentence.</p> <p>25 I think on its own terms it just says that, yes, you</p> <p style="text-align: right;">48</p>

<p>1 might be able to raise the HCVAP or Democratic 2 performance of the districts. What I found was to do 3 so would require allowing race or politics to 4 predominate and so I didn't include those maps. 5 Q. Did your maps include any jurisdictional 6 splits? 7 A. I -- there's certainly at least one, because as 8 I note, one of the things I was trying to respect were 9 the requests of the Yakama Nation and, as I recall, 10 the Yakama Nation boundaries go across jurisdictions. 11 This whole mess, for lack of a better 12 word, which led to this evidentiary hearing in March 13 was that the proposed remedial maps had split grounds 14 of the Yakama Nation. And so we had to revisit the 15 remedial maps that had been discussed to try to find 16 ways to craft a remedy that would also respect the 17 request of the Yakama Nation. 18 And so, like I said, I remember there is a 19 jurisdiction where the Yakama Nation's boundaries 20 traverse the jurisdiction and my recollection is that 21 I didn't split the jurisdiction, but, again, this is 22 going on six months ago and I haven't reviewed this in 23 depth since. 24 Q. I'm just trying to figure out, so you drew a 25 map here that had a goal of getting the HCVAP above</p> <p style="text-align: right;">49</p>	<p>1 in and slice out or at least I tried not to go in and 2 slice out Hispanic communities. And when there was a 3 choice between slicing out Hispanic communities or 4 allowing other traditional redistricting criteria to 5 predominate, I generally didn't defer to the question 6 of Hispanic communities. 7 It is a little tricky here, because, 8 again, the context of this whole thing was requests of 9 the Yakama Nation, which is intertwined with race, but 10 that was a directive from the Court that we had to 11 take account of, so... 12 Q. Okay. When you are reviewing the report of 13 another expert who has drawn a map that has an above 14 50 percent minority CVAP or VAP population, what's 15 your methodology for determining whether that expert 16 allowed racial considerations to predominate? 17 MR. STRACH: Objection. 18 A. Again, the Supreme Court's guidance on here is 19 a little more wishy washy than I think most social 20 scientists or even lawyers would like. Sometimes the 21 Court has even referenced looking to see if there are 22 ungainly or strange arms or appendages to the 23 district. 24 A lot of it does boil down to an eyeball 25 test, but you can look at the data, you can look and</p> <p style="text-align: right;">51</p>
<p>1 50 percent, correct? 2 A. Right. Point estimate up to 50 percent, 3 because that was what counsel asked for. 4 Q. I'm trying to understand in your view how do 5 you determine whether racial concerns are 6 predominating when someone has that goal? 7 A. Well, that might be what you are getting at, 8 but that wasn't the question you asked me. The 9 question you asked me was whether I split 10 jurisdictions. 11 Q. Dr. Trende, I'm asking you that question now. 12 A. Okay. What is your question now? 13 Q. My question is, when the goal is to draw a 14 district that has minority CVAP or minority BVAP 15 population above 50 percent, how do you know when 16 racial concerns are predominating in drawing that map 17 in your view? 18 MR. STRACH: Objection. 19 Go ahead. 20 A. Well, that's a very tricky thing to do. 21 Supreme Court guidance on this is sometimes all over 22 the place. When I drew it, I know what's going on in 23 my head, so I know that I'm not letting race 24 predominate. I had a generalized idea of where the 25 Hispanic population in the area was, but I didn't go</p> <p style="text-align: right;">50</p>	<p>1 see the way when a district does slice up 2 jurisdictions, or pick one jurisdiction over the 3 other, you can look at the way it has been cut. But I 4 don't think the Court has ever proscribed a 50 percent 5 plus 1 rule -- sorry, a specific rule that you can 6 use. 7 Q. Do you have a methodology that's more specific 8 than you can look at the data for determining whether 9 a district allows racial considerations to 10 predominate? 11 MR. STRACH: Objection. 12 Go ahead. 13 A. So I think I just gave a rather lengthy 14 discourse on methodology there. So I don't think 15 that's a fair characterization. I think that the 16 Court hasn't given as much guidance as we might like 17 and that sometimes in the Courts' instructions to 18 lawyers and experts have been things like looking to 19 see if there are odd arms or appendages to districts, 20 or if they have bizarre shapes. 21 But as I said, sometimes you can look at 22 the data, you can look at the way that a map when it 23 does split jurisdictions, how it splits them, whether 24 it splits them on racial grounds. You can, if you're 25 familiar with the communities of interest, you can</p> <p style="text-align: right;">52</p>

<p>1 consider those.</p> <p>2 You can look at when choices are made to</p> <p>3 depart from compactness, if that can be ascribed to</p> <p>4 racial reasons.</p> <p>5 Those are the various ways I'm aware of</p> <p>6 that you can do it.</p> <p>7 You can also run, in some circumstances</p> <p>8 you can run computer simulations, although the Court</p> <p>9 has been skeptical of that I think is the fair term.</p> <p>10 So I'm not entirely sure what the status</p> <p>11 of that is.</p> <p>12 Q. Okay. If there were an alternative map that</p> <p>13 had a higher minority population, but did worse on</p> <p>14 considerations like compactness, would you view that</p> <p>15 as evidence that racial considerations did not</p> <p>16 predominate?</p> <p>17 MR. STRACH: Objection.</p> <p>18 Go ahead.</p> <p>19 A. It would depend on circumstances. It might be</p> <p>20 evidence. I don't know that I'd consider it proof.</p> <p>21 Q. All right. Let's go to page 13 of this</p> <p>22 document, which is your supplemental report to Palmer.</p> <p>23 Are you there?</p> <p>24 A. I think so. Is this figure 6?</p> <p>25 Q. No.</p> <p style="text-align: right;">53</p>	<p>1 these estimates. Is that correct?</p> <p>2 A. That's right. Like I said, I came into this</p> <p>3 case pretty late in the game. But, no, there's no</p> <p>4 error margins.</p> <p>5 Q. Did you calculate error margins for these</p> <p>6 estimates before submitting them to the Court?</p> <p>7 A. I don't think I did.</p> <p>8 Q. Okay. Did you believe that the figures you</p> <p>9 were presenting to the Court in this case were</p> <p>10 unreliable?</p> <p>11 MR. STRACH: Objection.</p> <p>12 A. I don't think so, but if someone had calculated</p> <p>13 error margins they are real.</p> <p>14 Q. So you represented to the Court that your</p> <p>15 district was a 50 percent plus 1 minority district</p> <p>16 solely on the basis of CVAP calculations without any</p> <p>17 margin of error. Isn't that correct?</p> <p>18 MR. STRACH: Objection.</p> <p>19 A. I think I said it was 51.1 percent under the</p> <p>20 2021 data and 50.3 using the 2020 data.</p> <p>21 I didn't calculate error margins, because</p> <p>22 this case had been going on for quite some time and no</p> <p>23 one was using the error margins, but they were still</p> <p>24 there. And if someone were to say this is what the</p> <p>25 error margin is, it includes 50 percent, I think you</p> <p style="text-align: right;">55</p>
<p>1 A. That's page 13 of the PDF. I'm sorry.</p> <p>2 Okay, I'm here. 4.3?</p> <p>3 Q. 4.3, yes. You report there that your proposed</p> <p>4 map district 15 has an HCVAP of 51.1 percent using</p> <p>5 2021 data and 50.3 percent using the 2020 data. Did I</p> <p>6 read that correctly?</p> <p>7 A. Yes.</p> <p>8 Q. Okay. Does 2021 data refer to ACS one year</p> <p>9 estimate from 2021?</p> <p>10 A. I don't think so.</p> <p>11 Q. What does it refer to?</p> <p>12 A. Five-year estimate.</p> <p>13 Q. The five-year 2021 estimate?</p> <p>14 A. Right. So the data from 2021, 2020, '19, '18</p> <p>15 and '17.</p> <p>16 Q. Okay. Does the 2020 data, refers to ACS</p> <p>17 five-year estimate that includes 2016 through 2020?</p> <p>18 A. That's right.</p> <p>19 Q. Okay. This report doesn't suggest to the Court</p> <p>20 that there's anything unreliable about ACS data that</p> <p>21 includes 2020 responses. Is that correct?</p> <p>22 MR. STRACH: Objection.</p> <p>23 Go ahead.</p> <p>24 A. That's right.</p> <p>25 Q. Okay. You don't include margins of error for</p> <p style="text-align: right;">54</p>	<p>1 would be forced to say, well, okay, maybe it is not</p> <p>2 50 percent plus 1.</p> <p>3 I don't know whether the error margins</p> <p>4 here include 50 percent or not, though.</p> <p>5 Q. Okay. To calculate these estimates -- well,</p> <p>6 the districts that you presented in this report split</p> <p>7 block groups. Is that correct?</p> <p>8 A. That's right.</p> <p>9 Q. Okay. So to calculate these estimates you</p> <p>10 engaged in a disaggregation process to disaggregate</p> <p>11 block group level CVAP down to the block level. Is</p> <p>12 that correct?</p> <p>13 A. That's right.</p> <p>14 Q. Was that process similar to the process used by</p> <p>15 the redistricting data hub?</p> <p>16 A. Yes.</p> <p>17 Q. All right. In your report in this case you</p> <p>18 state that there are four issues with the process for</p> <p>19 disaggregating block groups CVAP data down to block</p> <p>20 level CVAP data. Do you recall that?</p> <p>21 A. Where are we?</p> <p>22 Q. Page 17 of your report.</p> <p>23 A. Yes.</p> <p>24 Q. Okay. In your report in Soto Palmer when you</p> <p>25 were using CVAP level -- CVAP data at the block level,</p> <p style="text-align: right;">56</p>

<p>1 you didn't identify any of those four issues. Is that 2 correct? 3 A. Well, that's right. Of course not. 4 Q. Okay. 5 A. We were in the remedial phase there, well past 6 Gingles 1. But they are still present. 7 Q. I'm going to transmit what I'm going to mark I 8 think as Exhibit 5. 9 (Deposition Exhibit No. 5 marked for 10 identification.) 11 BY MS. THEODORE: 12 Q. Is it your view that you can present unreliable 13 data to the Court at the remedial phase? 14 MR. STRACH: Objection. 15 A. No. It is my view that by the remedial phase 16 it is too late to raise collateral attacks on the 17 data. There's ways the data have been used and it is 18 fine to use data in that sense of things. 19 I don't know whether these error margins 20 include 50 percent or not, because we didn't calculate 21 the error margins. But all the issues present with 22 ACS data were present in all the maps drawn at the 23 remedial phase on the Soto Palmer case. 24 Q. But you did not identify any of those issues to 25 the Court?</p> <p style="text-align: right;">57</p>	<p>1 A. That's true. 2 Q. Okay. You felt comfortable doing that, even 3 though you didn't present any margin of error? 4 A. Well, yeah. 5 Q. Okay. Let's turn back to Exhibit 1, which is 6 your expert report, and in particular to pages 49 7 through 51, which is in the place in your CV where you 8 list prior expert engagements? 9 A. Okay. 10 Q. Okay. Can you identify cases in your CV in 11 which you criticized an expert for failing to 12 calculate margins of error associated with minority 13 CVAP data? 14 A. Stone v. Allen. 15 Q. Okay. Any cases other than Stone versus Allen? 16 A. No. 17 Q. Okay. When was the report filed in Stone 18 versus Allen? 19 A. I'll say spring. It was right after my kid's 20 spring break, so late March, early April 2024. 21 Q. Okay. Before '24 have you ever criticized 22 another expert for failing to calculate margins of 23 error associated with minority CVAP data? 24 A. I don't think I was ever asked to look at 25 whether their numbers showed failed the error margin.</p> <p style="text-align: right;">59</p>
<p>1 A. Well, no. We were in the remedial phase and 2 people have been using the data a given way. I wasn't 3 asked to inspect the data. I was asked to draw the 4 map with point estimates at above 50 percent, which is 5 what I did. 6 If Dr. Ayscue had gone back and calculated 7 error margins and said these error margins include 8 50 percent, my response would be, well, okay, these 9 aren't, I guess maybe we can't say with confidence 10 these aren't minority majority districts, but we 11 aren't in the Gingles 1 world, so there's not legal 12 significance to 50 percent plus 1 threshold, in my 13 view. 14 Q. All right. Your view is Dr. Ayscue should have 15 calculated margins of error for districts that you 16 were presenting? 17 A. If he wanted to challenge my districts on that 18 ground, that would have been the way to do it. But in 19 this case, which, again, had been going on for, to my 20 understanding, almost a year at this point, my view 21 was it was a little bit late to start talking about 22 data issues at the remedial phase. 23 Q. Okay. You certified the numbers in your Soto 24 Palmer report were true and correct to the best of 25 your knowledge and belief, right?</p> <p style="text-align: right;">58</p>	<p>1 And generally even if they're reporting CVAP numbers, 2 the VAPs are above 50 percent plus 1. So in my view 3 it's a completely different situation for Gingles 1. 4 But, no, I haven't looked at it before then. 5 Q. Okay. 6 A. Stone might have been the first time I ever 7 encountered a map where the VAP was below 50 percent, 8 but instead plaintiffs were relying on CVAP to prove 9 Gingles 1. 10 Q. In fact, in your 2023 preliminary injunction 11 report in this case you did not comment on the absence 12 of a margin of error for minority CVAP calculations. 13 Isn't that correct? 14 A. Yeah. I imagine I wasn't asked to look at it. 15 Q. You weren't asked to look -- you weren't asked 16 to be an expert on Gingles 1 issues at the preliminary 17 injunction stage in this case? 18 A. That's not what I said. I said I wasn't asked, 19 I probably wasn't asked to look at the error margins 20 for the CVAP. It was a preliminary injunction, so 21 things were going quickly and I was busy with other 22 cases. I don't know if I would have had time to do it 23 even if I had been asked. 24 Q. You had a month to write your preliminary 25 injunction report. Isn't that right?</p> <p style="text-align: right;">60</p>

<p>1 A. I don't know how much time I had. Like I said, 2 I was busy with other matters. I just wrapped up a 3 trial in the Michigan case. We were in the remedial 4 phase there. We were fighting a war in Wisconsin and 5 it's the holidays. So even if I had been asked to 6 look at the error margins, I don't know that I would 7 have had time to do it.</p> <p>8 As I recall my preliminary injunction 9 report in this case was pretty bare bones.</p> <p>10 Q. All right. Before 2024 had you ever calculated 11 a margin of error associated with a district CVAP 12 point estimate?</p> <p>13 A. I don't remember.</p> <p>14 Q. So sitting here today, you can't think of any 15 time before 2024 when you calculated a margin of error 16 associated with a district's CVAP point estimate?</p> <p>17 A. As I said, can't remember.</p> <p>18 Q. You understand that black CVAP estimates from 19 the ACS only -- let me start again.</p> <p>20 You understand that black CVAP estimates 21 from the ACS exclude people who are part black, part 22 Hispanic?</p> <p>23 A. Yes.</p> <p>24 Q. Okay. For purpose of black CVAP black is 25 defined by Census Bureau to include people who are</p> <p style="text-align: right;">61</p>	<p>1 Q. Sure. In cases that are not coalition cases, 2 it is standard to use any part black to calculate the 3 black voting age population. Is that fair?</p> <p>4 A. Yeah, I think that's right.</p> <p>5 Q. Okay. Okay. So in black CVAP calculation 6 citizens who are part black part Hispanic would be 7 included in the denominator, but the numerator. Is 8 that right?</p> <p>9 A. I guess it would depend how they answered the 10 Census question. If they, if the only option given to 11 them are black, Hispanic or American Indian, they 12 check black -- sorry, if they check black as the 13 answer on the ACS question, then I guess they would be 14 counted as black.</p> <p>15 Q. All right. Dr. Trende, if they checked black 16 and Hispanic on the ACS questionnaire, they would be 17 included in the denominator for the black CVAP 18 proportion calculation, but not the numerator. Is 19 that correct?</p> <p>20 A. I don't know if they would be counted as black 21 or not, like in the black category for the Census. I 22 don't think you just exclude them all together from 23 all consideration.</p> <p>24 But it is possible. Depends on how they 25 answered the question.</p> <p style="text-align: right;">63</p>
<p>1 black alone, part black and part white, and part black 2 and part American Indian. Is that correct?</p> <p>3 A. That's correct.</p> <p>4 Q. Okay. People who are part black and part 5 Hispanic are counted as black for purposes of the 6 Census count of black residents of voting age. Is 7 that right?</p> <p>8 A. If you are using any part black, yes.</p> <p>9 Q. Any part black is the standard that people use 10 in redistricting cases. Isn't that true?</p> <p>11 A. As I understand it, it is redistricting cases 12 where only one race, one racial group is at issue. If 13 you have multiple racial groups, it is a little bit 14 more unclear.</p> <p>15 Q. Okay.</p> <p>16 A. Because your groups can add up to greater than 17 100 percent. So if you are doing like a coalition 18 district, any part number results in pretty 19 substantial double count.</p> <p>20 Q. You understand this is not a coalition case, 21 correct?</p> <p>22 A. I know. It is just the way you asked that 23 question. This transcript is going to follow me 24 around. If I catch something, I try to clarify any 25 nuances. I do my best.</p> <p style="text-align: right;">62</p>	<p>1 Q. So sitting here today you don't have an 2 understanding of how people who mark that they are 3 part black and part Hispanic are included in the black 4 CVAP proportion calculation?</p> <p>5 A. Oh, so your question is -- okay. Your question 6 is that if they answer the ACS data that they are both 7 black and Hispanic, not that that's how they identify, 8 but that's how they answered the question, they would 9 be in the denominator, but not the numerator -- or the 10 other -- yeah, they would be in the denominator, but 11 not the numerator. That's right.</p> <p>12 Q. Okay. Unlike in the black voting age 13 population calculation, where they would be in the 14 numerator and the denominator. Is that right?</p> <p>15 A. Right. Yeah. There's lots of limitations to 16 the ACS data. That's one of them.</p> <p>17 Q. All right. So for that reason black CVAP 18 estimates from Census Bureau are going to tend to be 19 lower than actual number of citizens of voting age 20 population who are any part black. Is that true?</p> <p>21 MR. STRACH: Objection.</p> <p>22 A. It is possible.</p> <p>23 Q. Well, if there's anybody in the relevant region 24 who marks on the ACS response that they are part black 25 and part Hispanic, they won't be counted as black for</p> <p style="text-align: right;">64</p>

<p>1 purposes of the black CVAP calculation, correct?</p> <p>2 MR. STRACH: Objection.</p> <p>3 A. Right.</p> <p>4 Q. Okay. So isn't it true that black CVAP</p> <p>5 estimates will tend to be lower than the number of</p> <p>6 citizens of voting age population who are any part</p> <p>7 black?</p> <p>8 MR. STRACH: Objection.</p> <p>9 A. Well, it depends on whether there are people</p> <p>10 who fit the category that you describe who are also</p> <p>11 citizens in the district.</p> <p>12 Q. Okay. If there's anybody in the district who</p> <p>13 is a citizen who marks that they are part black and</p> <p>14 part Hispanic, then the black CVAP estimates from the</p> <p>15 Census Bureau are going to be lower than the actual</p> <p>16 number of citizens of voting age population who are</p> <p>17 any part black. Is that correct?</p> <p>18 A. If there's anyone -- not quite. If there's</p> <p>19 anyone in the district who, excuse me, or in the</p> <p>20 jurisdiction, who is, for example, part black or part</p> <p>21 Hispanic, who is a citizen and who was surveyed by the</p> <p>22 ACS, then the ACS estimates will be lower.</p> <p>23 Q. The ACS black CVAP estimates will be lower than</p> <p>24 the actual number of citizens of voting age population</p> <p>25 who are any part black in the situation that you just</p> <p style="text-align: right;">65</p>	<p>1 Q. So you calculated the number of Census tracts</p> <p>2 in North Carolina using your R code?</p> <p>3 A. Yes.</p> <p>4 Q. Okay.</p> <p>5 A. I downloaded the shapefile for Census tracts</p> <p>6 and there were 1,776 Census tracts.</p> <p>7 Q. This is all based on 2020 Census data?</p> <p>8 A. To my understanding, yes.</p> <p>9 Q. Okay. Then you took the number of Census</p> <p>10 tracts and divided by North Carolina's 2020 Census</p> <p>11 population to reach that average Census tract</p> <p>12 population of 5,878?</p> <p>13 A. That's my recollection.</p> <p>14 Q. Okay. Is that the same for the numbers you</p> <p>15 report for block groups?</p> <p>16 A. That's my recollection.</p> <p>17 Q. All right. This is Exhibit 6.</p> <p>18 (Deposition Exhibit No. 6 marked for</p> <p>19 identification.)</p> <p>20 BY MS. THEODORE:</p> <p>21 Q. Let me know when you have it up?</p> <p>22 A. Okay.</p> <p>23 Q. All right. Does this look to you like a</p> <p>24 printout from Census Bureau website tallies page?</p> <p>25 A. I have no idea. I can't authenticate this for</p> <p style="text-align: right;">67</p>
<p>1 described?</p> <p>2 A. Correct.</p> <p>3 Q. Okay. Okay. Let's turn to page 6 of your</p> <p>4 report?</p> <p>5 MR. STRACH: Did we skip to Exhibit 5?</p> <p>6 Are going to get to that later? You were having that</p> <p>7 loaded up.</p> <p>8 MS. THEODORE: That's a good point. We</p> <p>9 might get to that later, but we can skip over it for</p> <p>10 now.</p> <p>11 MR. STRACH: Okay.</p> <p>12 BY MS. THEODORE:</p> <p>13 Q. Are you on page 6, Dr. Trende?</p> <p>14 A. I am.</p> <p>15 Q. Okay. You see there's a paragraph there</p> <p>16 stating counties are then further broken into Census</p> <p>17 tracts?</p> <p>18 A. Yes.</p> <p>19 Q. This paragraph contains basic information about</p> <p>20 Census tracts and block groups and Census blocks in</p> <p>21 North Carolina?</p> <p>22 A. Correct.</p> <p>23 Q. All right. What's the source for the</p> <p>24 information in this paragraph?</p> <p>25 A. My R code.</p> <p style="text-align: right;">66</p>	<p>1 you. I don't have reason to dispute you, but I can't</p> <p>2 say for sure what it is.</p> <p>3 Q. Have you ever seen this page before?</p> <p>4 A. Not this particular page, no.</p> <p>5 Q. All right.</p> <p>6 A. That I know of.</p> <p>7 Q. All right. You understand that the Census</p> <p>8 Bureau tabulates, creates tallies of the number of</p> <p>9 Census blocks and block groups in Census tracts?</p> <p>10 A. Yes.</p> <p>11 Q. Okay. Let's go down to page 6.</p> <p>12 A. Okay.</p> <p>13 Q. All right. Do you see a table titled, "2020</p> <p>14 Census Tallies of Census Tracts, Block Groups and</p> <p>15 Blocks"?</p> <p>16 A. Yes.</p> <p>17 Q. Scroll down to row 37 of that table. Do you</p> <p>18 see a row for North Carolina?</p> <p>19 A. Yes.</p> <p>20 Q. Okay. Do you see Census Bureau is reporting</p> <p>21 that North Carolina has 2,672 Census tracts?</p> <p>22 A. Yes.</p> <p>23 Q. All right. Your report on page 6 says 1,776</p> <p>24 Census tracts?</p> <p>25 A. Yes.</p> <p style="text-align: right;">68</p>

<p>1 Q. So your number is wrong, isn't it?</p> <p>2 MR. STRACH: Objection.</p> <p>3 A. It might be. That's taken from the data source</p> <p>4 that Dr. Collingwood and I both used to download data,</p> <p>5 but if it doesn't download it correctly, then it is</p> <p>6 wrong.</p> <p>7 Q. Dr. Collingwood didn't create R code to tally</p> <p>8 up Census tracts, did he?</p> <p>9 A. No. But he says in his report that he</p> <p>10 regularly uses the tidycensus package in R, which is</p> <p>11 what I'm relying on.</p> <p>12 But if it gets the geographies wrong, then</p> <p>13 I guess that's wrong.</p> <p>14 Q. Okay. If that number is wrong, then the number</p> <p>15 you gave to the average population of a North Carolina</p> <p>16 Census tract is also wrong, isn't it?</p> <p>17 MR. STRACH: Objection.</p> <p>18 A. Yeah. I mean, that's just meant to give an</p> <p>19 idea of the scope of how big these things we're</p> <p>20 talking about -- yeah. If it is 2600, then the</p> <p>21 average would probably be more around 4,000 residents.</p> <p>22 Q. Right. Okay.</p> <p>23 You see on row 37 the Census Bureau is</p> <p>24 reporting that North Carolina has 7,111 block groups?</p> <p>25 A. Yes.</p> <p style="text-align: right;">69</p>	<p>1 average population would probably be more like 1200,</p> <p>2 1300.</p> <p>3 Q. 1468 sound about right?</p> <p>4 A. I have no idea. I can do rough estimates in my</p> <p>5 head. I can't do that.</p> <p>6 Q. All right. Well, you understand the population</p> <p>7 of North Carolina in the 2020 Census is 10,439,388?</p> <p>8 A. I'll take your word for it.</p> <p>9 Q. All right. That 10,439,388 divided by 7,111 is</p> <p>10 1468? Does that sound about right?</p> <p>11 A. I appreciate the vote of confidence, but I</p> <p>12 cannot even begin to do that in my head.</p> <p>13 Q. All right. You say in this paragraph that the</p> <p>14 largest block group in North Carolina contained 13,967</p> <p>15 residents. Do you see that?</p> <p>16 A. Yes.</p> <p>17 Q. How did you calculate that?</p> <p>18 A. That's, again, out of the tidycensus data.</p> <p>19 Q. Okay. That's in your R code somewhere?</p> <p>20 A. Yes.</p> <p>21 Q. Okay. Do you know where the block group in</p> <p>22 North Carolina that contains 13,967 residents is</p> <p>23 located?</p> <p>24 A. I would guess it is around Fayetteville, but I</p> <p>25 don't know for sure.</p> <p style="text-align: right;">71</p>
<p>1 Q. Your report says on page 6, North Carolina has</p> <p>2 4,967 block groups?</p> <p>3 A. That's right.</p> <p>4 Q. All right. So your statement in your report</p> <p>5 that there are 4,967 block groups in North Carolina is</p> <p>6 wrong, isn't it?</p> <p>7 MR. STRACH: Objection.</p> <p>8 A. I don't know that that's the case. I just know</p> <p>9 that using the tidycensus data that's downloaded from</p> <p>10 the Census API, that's what you come up with. But if</p> <p>11 there's not some nuance or other method to explain the</p> <p>12 data, then, yeah, I guess tidycensus provides the</p> <p>13 wrong data here.</p> <p>14 Q. Or you could have implemented tidycensus</p> <p>15 incorrectly. Isn't that right?</p> <p>16 MR. STRACH: Objection.</p> <p>17 A. I suppose it is possible.</p> <p>18 Q. Okay. You say average population of a block</p> <p>19 group in North Carolina was 2,102 residents on page 6,</p> <p>20 right?</p> <p>21 A. Right.</p> <p>22 Q. That number is also wrong if North Carolina has</p> <p>23 7,111 block groups, isn't it?</p> <p>24 MR. STRACH: Objection.</p> <p>25 A. Yes. If it has 7,111 block groups, then</p> <p style="text-align: right;">70</p>	<p>1 Q. All right.</p> <p>2 A. You get very large precincts and block groups</p> <p>3 down there with the military installation that I'm</p> <p>4 blanking on.</p> <p>5 Q. Are you aware that the North Carolina Office of</p> <p>6 State Budget and Management publishes statistics from</p> <p>7 the Census on its website?</p> <p>8 A. No.</p> <p>9 Q. All right. Mark this as Exhibit 7.</p> <p>10 (Deposition Exhibit No. 7 marked for</p> <p>11 identification.)</p> <p>12 BY MS. THEODORE:</p> <p>13 Q. Let me know when you have it open?</p> <p>14 A. Okay.</p> <p>15 Q. All right. Does this look to you like a</p> <p>16 printout from the website of the North Carolina Office</p> <p>17 of State Budget and Management?</p> <p>18 A. I don't have a reason to dispute you on that.</p> <p>19 Q. All right. You see it has 7,111 records</p> <p>20 reflecting the 7,111 block groups?</p> <p>21 A. I see that number, yeah.</p> <p>22 Q. All right. You want to scroll down to page 2</p> <p>23 of the PDF?</p> <p>24 A. Okay.</p> <p>25 Q. You see where it says area type block group,</p> <p style="text-align: right;">72</p>

<p>1 then it has the number 7,111?</p> <p>2 A. Yes.</p> <p>3 Q. Okay. All right. Then scroll down to the last</p> <p>4 page.</p> <p>5 A. Last page is blank.</p> <p>6 Q. I'm sorry, you are right. Second to last page.</p> <p>7 A. All right.</p> <p>8 Q. All right. Does this look like a table of the</p> <p>9 block groups in North Carolina sorted by total</p> <p>10 population?</p> <p>11 A. If you represent that to me, I have no reason</p> <p>12 to dispute you.</p> <p>13 Q. All right. You see it looks like the largest</p> <p>14 block group in North Carolina is Wake County, it has</p> <p>15 8,962 people?</p> <p>16 A. I see the table says value 8,962.</p> <p>17 Q. For total population?</p> <p>18 A. If you say so.</p> <p>19 Q. Well, it says total population right next to</p> <p>20 it, doesn't it?</p> <p>21 A. Yeah, it does say that. I just don't know that</p> <p>22 that's what's actually been pulled up by this table,</p> <p>23 but if that's what you represented, I don't have a</p> <p>24 reason to dispute you.</p> <p>25 Q. All right. Sitting here today do you have</p> <p style="text-align: right;">73</p>	<p>1 records?</p> <p>2 A. Yes.</p> <p>3 Q. All right. Go down to page 2.</p> <p>4 A. Okay.</p> <p>5 Q. You see the area type described is tract?</p> <p>6 A. Yes.</p> <p>7 Q. Okay. Why don't you scroll down to page 4?</p> <p>8 A. (Witness complies.)</p> <p>9 Okay.</p> <p>10 Q. All right. Does this look like a table from</p> <p>11 the North Carolina Office of State Budget and</p> <p>12 Management website that's sorting the tracts in North</p> <p>13 Carolina on the basis of total population?</p> <p>14 A. I've never been to this website before, so I</p> <p>15 can't say what it looks like, but I have no reason to</p> <p>16 dispute you on that.</p> <p>17 Q. Do you see the largest Census tract reported on</p> <p>18 this table has 14,610 people in it?</p> <p>19 A. Yes. At least, if that's what this is actually</p> <p>20 reflecting, if it is all the tracts in North Carolina</p> <p>21 sorted by population.</p> <p>22 Q. Okay. You say in your report that the largest</p> <p>23 tract in North Carolina contains 34,130 residents,</p> <p>24 correct?</p> <p>25 A. Correct.</p> <p style="text-align: right;">75</p>
<p>1 confidence in your report's statement that the largest</p> <p>2 block group in North Carolina contained 13,967 people?</p> <p>3 MR. STRACH: Objection.</p> <p>4 A. First, I'd want to go back and double-check</p> <p>5 against what you are suggesting, but I don't -- R code</p> <p>6 typically doesn't lie, so maybe there's a mistake with</p> <p>7 tidycensus or maybe there's a mistake in the code.</p> <p>8 The real point of this exercise, which I</p> <p>9 don't think is terribly controversial, is to kind of</p> <p>10 help the Court understand what Census geographies are,</p> <p>11 not to talk about the average populations or whatnot.</p> <p>12 You are just trying to get a sense of, okay, counties</p> <p>13 break down in tracts, break down in block groups,</p> <p>14 which break down in blocks.</p> <p>15 MS. THEODORE: I'll transmit the next</p> <p>16 exhibit. Can you let me know when you have it open?</p> <p>17 (Deposition Exhibit No. 8 marked for</p> <p>18 identification.)</p> <p>19 THE WITNESS: Okay.</p> <p>20 BY MS. THEODORE:</p> <p>21 Q. All right. You see this is another printout</p> <p>22 from the North Carolina Office of State Budget and</p> <p>23 Management?</p> <p>24 A. Yes.</p> <p>25 Q. All right. You see it says it has 2,672</p> <p style="text-align: right;">74</p>	<p>1 Q. Okay. Where is that tract?</p> <p>2 A. I don't know.</p> <p>3 Q. All right. Do you have confidence sitting here</p> <p>4 today that there's a tract that contains that many</p> <p>5 residents in North Carolina?</p> <p>6 MR. STRACH: Objection.</p> <p>7 A. Well, it is the same answer as before. I'd</p> <p>8 want to go back and check my data. But I don't have</p> <p>9 any reason to think that tidycensus got it wrong.</p> <p>10 Maybe there's some nuance between these and what the</p> <p>11 table shows. I don't know.</p> <p>12 Q. When you say tidycensus got it wrong or your</p> <p>13 implementation of tidycensus was wrong, right?</p> <p>14 MR. STRACH: Objection.</p> <p>15 A. It's possible.</p> <p>16 Q. Okay.</p> <p>17 A. By the way, I don't want to cut you off in the</p> <p>18 middle of a line of questioning, but we have been</p> <p>19 going for a little over an hour, so whenever you get</p> <p>20 to a different change of topic, it might be a good</p> <p>21 time for a break. We can go for another hour and then</p> <p>22 take lunch.</p> <p>23 MS. THEODORE: Yeah. Why don't we take a</p> <p>24 break right now, like 5 minutes.</p> <p>25 (Recess taken.)</p> <p style="text-align: right;">76</p>

<p>1 BY MS. THEODORE:</p> <p>2 Q. Did you discuss anything about this deposition</p> <p>3 with counsel on the break?</p> <p>4 A. Yes.</p> <p>5 Q. What did you discuss?</p> <p>6 A. I said I didn't know where the discrepancy came</p> <p>7 from on the Census tracts versus -- what you report</p> <p>8 versus what the report says.</p> <p>9 Q. Okay. What did counsel say?</p> <p>10 MR. STRACH: I object to that, instruct</p> <p>11 him not to answer that.</p> <p>12 A. I'll listen to counsel.</p> <p>13 MS. THEODORE: Your position is that I'm</p> <p>14 not entitled to know what you're telling Dr. Trendé</p> <p>15 during the pendency of the deposition about the</p> <p>16 deposition?</p> <p>17 MR. STRACH: We didn't discuss any of his</p> <p>18 answers or come back in here to correct anything.</p> <p>19 Anything we discussed would have been privileged going</p> <p>20 forward.</p> <p>21 BY MS. THEODORE:</p> <p>22 Q. Dr. Trendé, did you discuss any of your prior</p> <p>23 answers with counsel?</p> <p>24 A. Only to the extent that I didn't know where</p> <p>25 the -- I brought it up that I didn't know where the</p> <p style="text-align: right;">77</p>	<p>1 Q. All right. Okay. In your August report you</p> <p>2 state that you're calculating margins of error for the</p> <p>3 black CVAP percentage point estimates for</p> <p>4 Mr. Esselstyn's demonstration districts, correct?</p> <p>5 A. That's right.</p> <p>6 Q. All right. And I think you previously</p> <p>7 testified that the only time you have previously</p> <p>8 calculated margins of error for CVAP point estimates</p> <p>9 was in the Stone versus Allen case. Is that right?</p> <p>10 A. Yes. Actually, just as you bring that up --</p> <p>11 yeah, actually I think that's right.</p> <p>12 Q. Okay. You say in your report that you relied</p> <p>13 on the method of calculating margins of error in</p> <p>14 chapter 8 of the American Community Survey Handbook.</p> <p>15 Is that correct?</p> <p>16 A. That's right.</p> <p>17 Q. All right. I'm going to mark what I just</p> <p>18 transmitted in the chat as Exhibit 9.</p> <p>19 (Deposition Exhibit No. 9 marked for</p> <p>20 identification.)</p> <p>21 BY MS. THEODORE:</p> <p>22 Q. Can you let me know when you have it up?</p> <p>23 A. Okay.</p> <p>24 Q. All right. Do you recognize this as chapter 8</p> <p>25 of the American Community Survey Handbook?</p> <p style="text-align: right;">79</p>
<p>1 difference came from.</p> <p>2 Q. Okay. Did counsel say anything about your</p> <p>3 prior answers?</p> <p>4 A. No.</p> <p>5 Q. All right. With respect to those issues we</p> <p>6 were talking about in paragraph on page 6 of your</p> <p>7 report, did you do anything to verify what tidycensus</p> <p>8 was producing from your code?</p> <p>9 A. No. It is something that people regularly rely</p> <p>10 upon, so no.</p> <p>11 Q. You didn't go check the Census Bureau website</p> <p>12 to make sure that when your code said 1776 Census</p> <p>13 tracts, that that was consistent with the Census</p> <p>14 Bureau website?</p> <p>15 A. No. Again, this is a minor point in the report</p> <p>16 that doesn't have anything to do with final</p> <p>17 conclusions. It is just meant to kind of illustrate,</p> <p>18 you know, we talk about tracts and block groups and</p> <p>19 blocks, and everything. The whole point here is to</p> <p>20 kind of, in case the Court didn't already have it,</p> <p>21 give an understanding of what these things are.</p> <p>22 So it is not the type of thing that I</p> <p>23 would have dug down and verified, anyway. But, like I</p> <p>24 said, I'm genuinely curious where the discrepancy</p> <p>25 comes from.</p> <p style="text-align: right;">78</p>	<p>1 A. Yes.</p> <p>2 Q. Okay. The black CVAP percentage in a</p> <p>3 particular region is a proportion, correct?</p> <p>4 A. Right.</p> <p>5 Q. All right. In particular it's the proportion</p> <p>6 created by dividing the number of black citizens of</p> <p>7 voting age by number of total citizens of voting age?</p> <p>8 A. That's right.</p> <p>9 Q. All right. Let's turn to page 64 of the ACS</p> <p>10 handbook.</p> <p>11 A. (Witness complies.)</p> <p>12 Okay.</p> <p>13 Q. Do you see the formula in the middle of the</p> <p>14 page with number 6 in parentheses next to it?</p> <p>15 A. Yes.</p> <p>16 Q. All right. Is that the correct formula to use</p> <p>17 to calculate the margin of error for a black CVAP</p> <p>18 percentage point estimate?</p> <p>19 A. Yes.</p> <p>20 Q. All right. The formula is for calculating the</p> <p>21 margin of error of a proportion represented by X</p> <p>22 divided by Y?</p> <p>23 A. Correct.</p> <p>24 Q. Here X is black CVAP, and Y is total CVAP?</p> <p>25 A. Correct.</p> <p style="text-align: right;">80</p>

<p>1 Q. All right. So first you calculate the margin 2 of error for black CVAP and for total CVAP, right? 3 A. Correct. 4 Q. Okay. Under the square root sign in the 5 formula you are supposed to start with the margin of 6 error for black CVAP squared, which is represented by 7 MOE parentheses X squared. Is that correct? 8 A. That's right. 9 Q. All right. Then you subtract the number that's 10 calculated based on margin of error for total CVAP 11 represented in the formula as MOE parentheses Y. Is 12 that right? 13 A. Correct. 14 Q. Okay. Did your code correctly implement this 15 formula? 16 A. No. 17 Q. All right. I'm going to mark as Exhibit 10. 18 (Deposition Exhibit No. 10 marked for 19 identification.) 20 BY MS. THEODORE: 21 Q. Let me know when you have this up? 22 A. Okay. 23 Q. Do you recognize this as a copy of the R code 24 you turned over in this case? 25 A. It looks like it.</p> <p style="text-align: right;">81</p>	<p>1 Q. That's the code you used to calculate the 2 margin of error for the black CVAP percentage for 3 demonstration district 1 -- for demonstration district 4 D1? 5 A. Yes. 6 Q. All right. Your code doesn't start with margin 7 of error for the black CVAP squared and then subtract 8 a number calculated based on the margin of error for 9 total CVAP, does it? 10 A. No, no. It has an error in it. Thankfully it 11 doesn't change the ultimate conclusion, but it has an 12 error in it. 13 Q. You invert black CVAP and total CVAP, correct? 14 A. That's one of the -- yeah. There's two errors 15 in it, as I recall. But, yeah, that's one of them. 16 Q. All right. So this error is replicated in all 17 the code lines that you used to calculate margin of 18 error for any of the demonstration districts using 19 2020 or 2022 ACS numbers. Is that right? 20 A. Yeah. That's right. 21 Q. All right. So every margin of error number 22 presented in your report is incorrect. Is that true? 23 A. Certainly of the black estimates of CVAP. I 24 don't know if there are any other ones in there, but, 25 yeah, the error margin for the black estimates of CVAP</p> <p style="text-align: right;">83</p>
<p>1 Q. Okay. 2 A. I don't have any reason to dispute you on that. 3 Q. You see the first line says, C/user/Sean T, et 4 cetera? 5 A. Yeah. This isn't the form that I produced it 6 in, but it looks, like I said, it looks like what I 7 produce. I don't have any reason to believe you would 8 be less than forthcoming on it. 9 I've just also done this enough to know 10 when to leave a little wiggle room just in case and in 11 the event that something went south, but I don't have 12 a reason to dispute you. It looks like it. 13 Q. Okay. This contains the code you used to 14 calculate margin of error? 15 A. That's right. 16 Q. Let's go to page 10 of the PDF. 17 A. (Witness complies.) 18 Q. Let me know when you're there? 19 A. All right. 20 Q. In the middle do you see a line that starts 21 with D1_CVAP mutate open parentheses MOE, and then 22 continues? 23 A. Yeah. We can call the parentheses greater than 24 parentheses and then or pipe. But, yeah, D1_CVAP, 25 then mutate MOE equals 1 over CVAP, et cetera.</p> <p style="text-align: right;">82</p>	<p>1 are wrong. 2 Q. Okay. So every error margin you calculate for 3 the black CVAP percentage of the demonstration 4 district is wrong and unreliable. Is that correct? 5 MR. STRACH: Objection. 6 A. It is wrong. Yeah. 7 Q. Okay. Did you fail to understand how the 8 margin of error formula worked when you wrote your 9 code? 10 A. No. I just coded it wrong. 11 Q. Did you check your work? 12 A. Yes. 13 Q. You just didn't notice this error? 14 A. Yes. 15 Q. You agree this is a serious error? 16 MR. STRACH: Objection. 17 A. I mean, it certainly gives the wrong answer, 18 but, like I said, it doesn't change the conclusions. 19 Even if we use what Dr. Collingwood estimated these 20 districts are all still -- we can't say that they are 21 different than 50 percent. So it could have been a 22 lot worse I suppose. 23 Q. So Dr. Collingwood showed that this error had 24 the effect of substantially increasing the margin of 25 error. Do you agree with that?</p> <p style="text-align: right;">84</p>

<p>1 A. I think it went from 1.8 -- or from 1.3 to 1.8.</p> <p>2 Q. All right. This wasn't the only mistake you</p> <p>3 made in calculating margin of error, was it?</p> <p>4 A. I'm not sure about that.</p> <p>5 Q. All right. Well, to implement the formula for</p> <p>6 calculating margin of error at the black CVAP</p> <p>7 proportion, you first need to calculate margin of</p> <p>8 error for the estimate of total black CVAP in the</p> <p>9 relevant region, correct?</p> <p>10 A. That's right.</p> <p>11 Q. That's the numerator in the black CVAP</p> <p>12 percentage point estimate?</p> <p>13 A. Yeah.</p> <p>14 Q. All right. You calculate that by adding up the</p> <p>15 estimates for black citizens in each of the three</p> <p>16 subcategories that are black alone, black and white in</p> <p>17 combination, and black and American Indian?</p> <p>18 A. Yes. I saw what Dr. Collingwood wrote about</p> <p>19 that. I didn't really investigate that closely,</p> <p>20 because it looks like that would have actually been an</p> <p>21 error in plaintiffs' favor. So I don't know if it is</p> <p>22 an error or not.</p> <p>23 At the end of the day I got to the end of</p> <p>24 it and saw that it was still within the error margin</p> <p>25 of 50 percent. So I'm content to use</p> <p style="text-align: right;">85</p>	<p>1 Q. All right. See there's a formula on that page</p> <p>2 with the parentheses, with (1) next to it?</p> <p>3 A. Yes.</p> <p>4 Q. All right. That formula explains how to</p> <p>5 calculate the margin of error for an aggregated</p> <p>6 estimate of multiple components?</p> <p>7 A. It looks like it. I haven't looked at this in</p> <p>8 a while.</p> <p>9 Q. You looked at it when you were writing your</p> <p>10 report in this case, didn't you?</p> <p>11 A. Yeah.</p> <p>12 Q. Okay. Is that the formula you were attempting</p> <p>13 to use to calculate the margin of error for the</p> <p>14 combined count of the three subcategories of black</p> <p>15 citizens of voting age?</p> <p>16 A. I honestly don't remember. Like I said, I</p> <p>17 haven't looked into this issue Dr. Collingwood raised</p> <p>18 that much, because it resulted in an error in</p> <p>19 plaintiffs' favor, if there's an error.</p> <p>20 Q. You don't know whether this is the correct</p> <p>21 formula to use to calculate the margin of error for</p> <p>22 the black CVAP that's in the numerator of the black</p> <p>23 CVAP proportion?</p> <p>24 A. I think it is. This is a, what, nine page</p> <p>25 document full of formula.</p> <p style="text-align: right;">87</p>
<p>1 Dr. Collingwood's estimates.</p> <p>2 Q. Well, Dr. Trendé, we'll turn to</p> <p>3 Dr. Collingwood's estimate in a minute, but I just</p> <p>4 want to stick with your, the numbers in your report.</p> <p>5 You understand that -- so to calculate</p> <p>6 margin of error for the black CVAP estimate you have</p> <p>7 to combine margins of error for each of the three</p> <p>8 subgroups I mentioned, right?</p> <p>9 A. Yeah. Like I explained in my previous answer,</p> <p>10 I saw that in Dr. Collingwood's report, about the</p> <p>11 order in which you should be adding together the error</p> <p>12 margins of the individual subgroups, and I saw that</p> <p>13 when I did it it caused an error in plaintiffs' favor.</p> <p>14 So I didn't really investigate that much further. I</p> <p>15 didn't really investigate much of this that much</p> <p>16 further, because at the end of the day everything</p> <p>17 Dr. Collingwood estimated is consistent with my</p> <p>18 opinion in this case.</p> <p>19 Bottom line is I don't know that that's an</p> <p>20 error there.</p> <p>21 Q. Let's go to the ACS handbook that we previously</p> <p>22 were looking at, I think that was Exhibit 9. Can you</p> <p>23 go to page 59?</p> <p>24 A. (Witness complies.)</p> <p>25 Okay.</p> <p style="text-align: right;">86</p>	<p>1 I know that one thing, that regarding</p> <p>2 formula 6 is an error, because I did look closely at</p> <p>3 that, because I was curious whether that was a mistake</p> <p>4 or not.</p> <p>5 I didn't look that closely into this one,</p> <p>6 because it made an error in plaintiffs' favor and was</p> <p>7 fairly small. At the end of the day everything worked</p> <p>8 out.</p> <p>9 Q. So you think this is the formula that you used,</p> <p>10 that you are supposed to use to calculate the margin of</p> <p>11 error for the black CVAP number that goes into the</p> <p>12 numerator, but you are not sure. Is that your</p> <p>13 testimony?</p> <p>14 A. Yes.</p> <p>15 Q. Okay. I want to turn to Exhibit 10, your peer</p> <p>16 script, go to page 5.</p> <p>17 A. (Witness complies.)</p> <p>18 Okay.</p> <p>19 Q. Okay. You see in the middle of the page</p> <p>20 there's a line that says, "CVAP_block_total_MOE equals</p> <p>21 SQRT parentheses, and then it continues?</p> <p>22 A. Yes.</p> <p>23 Q. All right. Is that the line in your code where</p> <p>24 you were calculating the margin of error for the black</p> <p>25 CVAP number that goes in the numerator of the black</p> <p style="text-align: right;">88</p>

<p>1 CVAP proportion?</p> <p>2 A. I honestly don't remember. It is 28 lines of</p> <p>3 code.</p> <p>4 Q. Can you point to anywhere else in this code</p> <p>5 where you are calculating the margin of error for the</p> <p>6 black CVAP total that goes in the numerator of the</p> <p>7 black CVAP proportion?</p> <p>8 A. Certainly not as I sit here.</p> <p>9 Q. All right. You see that the code we were just</p> <p>10 looking at, it squares CVAP_black_MOE, you see that?</p> <p>11 A. Yes.</p> <p>12 Q. It doesn't square CVAP_black_white_MOE,</p> <p>13 correct?</p> <p>14 A. That's right.</p> <p>15 Q. It doesn't square CVAP_NA_black_MOE, correct?</p> <p>16 A. That's right.</p> <p>17 Q. All right. Do those categories correspond to</p> <p>18 the three categories we were discussing before of</p> <p>19 black CVAP, or people who are black or white -- I'm</p> <p>20 sorry. Let me start again.</p> <p>21 Do those categories correspond to the</p> <p>22 three categories we were discussing before that go</p> <p>23 into the black CVAP calculation?</p> <p>24 A. Yes.</p> <p>25 Q. All right.</p> <p style="text-align: right;">89</p>	<p>1 A. Certainly larger.</p> <p>2 Q. All right. All your margin of error</p> <p>3 calculations were based on the block groups that you</p> <p>4 conclude were contained in whole or in part in</p> <p>5 Mr. Esselstyn's demonstration districts B and D,</p> <p>6 correct?</p> <p>7 A. That's correct.</p> <p>8 Q. How did you determine which block groups were</p> <p>9 contained in whole or in part in the demonstration</p> <p>10 districts?</p> <p>11 A. That is through the R code.</p> <p>12 Q. Is that a function called ST Intersect?</p> <p>13 A. I believe so, yes.</p> <p>14 Q. What does that function do?</p> <p>15 A. It looks at the block groups that intersect the</p> <p>16 map and prints them out.</p> <p>17 Q. Okay. Are you aware that that function</p> <p>18 ST Intersect select block groups that border a</p> <p>19 particular region, but are not necessarily actually</p> <p>20 contained in the region?</p> <p>21 A. I don't know.</p> <p>22 Q. You don't know if that's true today?</p> <p>23 A. I don't know if that's true today.</p> <p>24 Q. Okay. Did you check the block groups produced</p> <p>25 by the ST Intersect function to make sure that they</p> <p style="text-align: right;">91</p>
<p>1 A. It is black alone, part black, part white, part</p> <p>2 Native American, part black.</p> <p>3 Q. All right. Any reason you can think of why it</p> <p>4 would be appropriate to square the margin of error for</p> <p>5 black alone, but not the margin of error for part</p> <p>6 black part white or part black part Native American?</p> <p>7 A. I don't remember. Like I said, this was a</p> <p>8 while ago.</p> <p>9 Q. Okay. So sitting here today, you are not</p> <p>10 disputing Dr. Collingwood's conclusion that you</p> <p>11 implemented this part of the formula incorrectly also,</p> <p>12 right?</p> <p>13 A. No. Like I testified, I looked at it, I saw</p> <p>14 that it resulted in error in plaintiffs' favor, didn't</p> <p>15 change the ultimate answer. That one I didn't dig in</p> <p>16 to much.</p> <p>17 Q. All right. The error, the first mistake that</p> <p>18 we discussed caused an error in defendants' favor.</p> <p>19 Isn't that right?</p> <p>20 A. That's right.</p> <p>21 Q. All right. The size of that error in</p> <p>22 defendants' favor dwarfed the size of the error in</p> <p>23 plaintiffs' favor caused by the second error. Isn't</p> <p>24 that right?</p> <p>25 MR. STRACH: Objection.</p> <p style="text-align: right;">90</p>	<p>1 were actually contained in demonstration districts B</p> <p>2 and D?</p> <p>3 A. I mean, there's nothing to check it against.</p> <p>4 If Mr. Esselstyn had produced a block assignment file</p> <p>5 or block equivalency file, I could have done that, but</p> <p>6 he didn't, and so you are reliant upon the geometries</p> <p>7 that are estimated by the computer.</p> <p>8 Q. Your testimony is that it's not possible to</p> <p>9 open up a shapefile and check to see what block groups</p> <p>10 are in that shapefile?</p> <p>11 A. Well, when you have a map that splits block</p> <p>12 groups, you can't just eyeball that and see if there's</p> <p>13 differences, because there might be just slight bits</p> <p>14 of overlap or a single block. It's much easier to do</p> <p>15 this with block assignment files than shapefiles.</p> <p>16 Q. Is your testimony that you couldn't have opened</p> <p>17 up a shapefile in Maptitude or another redistricting</p> <p>18 software and checked to see which block groups were</p> <p>19 contained in the demonstration districts?</p> <p>20 A. My testimony is that having the shapefile from</p> <p>21 Mr. Esselstyn, I ran it through the code in R, and</p> <p>22 these are the block groups that R identified as being</p> <p>23 in the district, and I don't know any reason not to</p> <p>24 rely upon R's process.</p> <p>25 Q. Could you have opened up the shapefiles in</p> <p style="text-align: right;">92</p>

<p>1 Maptitude or other redistricting software to check to 2 see which block groups were in the districts? 3 A. Perhaps to double-check it, I guess I could 4 have done that. 5 Q. You didn't? 6 A. But I didn't have a reason not to trust R's 7 approach to it. 8 Q. You didn't open up the shapefiles to 9 double-check? 10 A. I didn't double-check in a separate program, 11 no. 12 Q. Okay. When you used ST Intersect, you didn't 13 know whether it identified block groups in the 14 district or block groups that were adjoining the 15 district? 16 A. That border the district, that's right. If 17 there's overlap between the boundaries or if it's the 18 result of a block being read in from one place to 19 another, I don't know. 20 Q. Okay. Did you ever ask counsel to ask for a 21 block equivalency file from Mr. Esselstyn? 22 A. No. 23 Q. All right. Have you reviewed the portion of 24 Dr. Collingwood's report where he looks at your code 25 and reports that you included block groups that are</p> <p style="text-align: right;">93</p>	<p>1 those groups to the demonstration districts? 2 A. I don't dispute it. I haven't checked. 3 Q. Okay. You don't dispute that they are not in 4 the demonstration districts? 5 A. I don't dispute it one way or the other. 6 Q. All right. You didn't think it was important 7 to go back and check to see whether your calculation 8 of the block groups was accurate after a question was 9 raised about it by another expert? 10 A. I looked to see what his bottom line was and if 11 it changed my ultimate conclusion that I'd be 12 testifying to, and it didn't. So as of this 13 deposition I haven't gone back and double-checked it. 14 I don't know if my testimony is going to 15 be that block group 371399606001 is in the district or 16 not, but I certainly wouldn't represent anything to 17 the Court that was incorrect. 18 Q. You are suggesting you might go and check after 19 this deposition? 20 A. I might check it after the deposition. 21 Q. You've had a month since you received 22 Dr. Collingwood's report, right? 23 A. That is true. 24 Q. Okay. You haven't seen fit to check that in 25 the last month?</p> <p style="text-align: right;">95</p>
<p>1 entirely outside of demonstration districts B and D? 2 A. I did. 3 Q. Do you dispute that conclusion? 4 A. I don't dispute it one way or the other. 5 Q. You haven't gone back to check whether you were 6 correct? 7 A. No. 8 Q. All right. Mark this as Exhibit 11. 9 (Deposition Exhibit No. 11 marked for 10 identification.) 11 BY MS. THEODORE: 12 Q. Let me know when you have it open? 13 A. Can I get a hard copy? 14 Okay. 15 Q. Do you recognize this as a copy of 16 Dr. Collingwood's rebuttal report in this case? 17 A. Yes. 18 Q. All right. Let's go to page 11. 19 A. (Witness complies.) 20 Okay. 21 Q. All right. Dr. Collingwood's report lists two 22 specific block groups that your code assigns to the 23 demonstration districts. Do you see that? 24 A. Yes. 25 Q. Okay. Do you agree that your code assigns</p> <p style="text-align: right;">94</p>	<p>1 A. I haven't checked it in the last month. 2 Dr. Collingwood has already demonstrated 3 an error in my code, so I won't be testifying that the 4 error margin is whatever it was reported in the code, 5 which to me sort of reduced the urgency of checking 6 other things that are smaller errors. Once I saw 7 Dr. Collingwood's estimated error margins are still, 8 would still render the district within 50 percent plus 9 1, and so my ultimate testimony wouldn't be changed, 10 that sort of reduced the fire alarm on some of these 11 other issues. 12 If there hadn't been an error in formula 13 6, I probably would have gone back and checked some of 14 these other issues a little bit more closely. 15 Q. Okay. 16 A. I imagine if I rerun my code, R is going to 17 identify block groups 371399606001 and 371399607012 as 18 being within the district. 19 Q. Let's turn to page 23 and 24 of your report. 20 A. (Witness complies.) 21 Q. Start with page 23. Are you there? 22 A. Yes. 23 Q. Okay. What you are doing -- you see the 24 sentence that says, "the total estimated CVAP for the 25 block groups in the district D-1 is 169225?"</p> <p style="text-align: right;">96</p>

<p>1 A. 169225, yes.</p> <p>2 Q. Thanks for that correction.</p> <p>3 You see it says the total estimated black</p> <p>4 CVAP for the block groups in district D-1 is 83,992?</p> <p>5 A. Yes.</p> <p>6 Q. All right. So this isn't a margin of error</p> <p>7 calculation, correct?</p> <p>8 A. Correct.</p> <p>9 Q. You are just totaling the black CVAP and CVAP</p> <p>10 for the block groups in demonstration districts B</p> <p>11 and D. Is that right?</p> <p>12 A. Correct.</p> <p>13 Q. Okay. Those calculations were performed in R</p> <p>14 using the same script that we marked as Exhibit 10?</p> <p>15 A. Oh yeah. Using the same script as Exhibit 10,</p> <p>16 right.</p> <p>17 Q. Okay. If the block groups that your R code</p> <p>18 assigned to demonstration districts B and D are</p> <p>19 incorrect, then that number is incorrect, isn't it?</p> <p>20 A. Yeah. I think Mr. Esselstyn gives his own</p> <p>21 estimate of the 2022 BCVP for the district that still</p> <p>22 remains, I think D-1. So I think it was pretty much</p> <p>23 the same as what I had.</p> <p>24 But I think, if I recall correctly, I</p> <p>25 calculated this using the disaggregated block data</p> <p style="text-align: right;">97</p>	<p>1 Q. All right. You reviewed this report?</p> <p>2 A. Yes.</p> <p>3 Q. Can you turn to page 18?</p> <p>4 A. (Witness complies.)</p> <p>5 Okay.</p> <p>6 Q. All right. Do you see there in paragraph 35</p> <p>7 Mr. Esselstyn states that the numbers you provided for</p> <p>8 the total estimated CVAP for the block groups in</p> <p>9 district B-1 and the total estimated black CVAP for</p> <p>10 block groups in district D-1?</p> <p>11 A. I see that, yes.</p> <p>12 Q. All right. So he says that your numbers are</p> <p>13 wrong, doesn't he?</p> <p>14 A. He does.</p> <p>15 Q. You haven't gone back and checked to confirm</p> <p>16 whether they are right or wrong?</p> <p>17 A. No.</p> <p>18 Q. Okay. All right. We have already established</p> <p>19 that this plus or minus 2.1 percent number on page 23</p> <p>20 is wrong, correct?</p> <p>21 A. That's right.</p> <p>22 Q. The number is incorrect?</p> <p>23 A. Yes.</p> <p>24 Q. Okay. All right. Then on page 24, you</p> <p>25 calculate the black CVAP proportion for the block</p> <p style="text-align: right;">99</p>
<p>1 from -- the disaggregated block data from</p> <p>2 redistricting data hub, but I'm not sure.</p> <p>3 Q. Well, you would have calculated this using</p> <p>4 disaggregated block data for block groups that you</p> <p>5 assigned to district D-1, correct?</p> <p>6 A. Yeah, so there's two different ways that this</p> <p>7 stuff -- I think I did, I looked at the blocks that</p> <p>8 were specifically assigned to the district and using</p> <p>9 the redistricting data hub data you can look only at</p> <p>10 those blocks that are assigned.</p> <p>11 But I honestly don't remember. I don't</p> <p>12 remember this specific issue being raised by</p> <p>13 Dr. Collingwood, so I just can't say anything about it</p> <p>14 as I sit here.</p> <p>15 Q. This specific -- this specific issue was raised</p> <p>16 by Mr. Esselstyn, wasn't it?</p> <p>17 A. I don't remember that.</p> <p>18 Q. Okay. I'm going to transmit what I'm going to</p> <p>19 mark as Exhibit 12.</p> <p>20 (Deposition Exhibit No. 12 marked for</p> <p>21 identification.)</p> <p>22 BY MS. THEODORE:</p> <p>23 Q. Do you recognize this as a copy of</p> <p>24 Mr. Esselstyn's rebuttal report?</p> <p>25 A. Yes.</p> <p style="text-align: right;">98</p>	<p>1 groups in district D-1 using 2020 and 2022 ACS data.</p> <p>2 Is that correct?</p> <p>3 A. On page -- wait, I'm looking on his report. 24</p> <p>4 of my report or his?</p> <p>5 Q. Yours.</p> <p>6 A. Okay. Yes.</p> <p>7 Q. All right. You understand Mr. Esselstyn states</p> <p>8 that your calculations are incorrect?</p> <p>9 A. He might. I don't remember that.</p> <p>10 Q. Why don't you flip back to his report and look</p> <p>11 at paragraph 36?</p> <p>12 A. (Witness complies.)</p> <p>13 Okay.</p> <p>14 Q. He states that the numbers that you calculate</p> <p>15 for the black CVAP percentage of the block groups in</p> <p>16 his district D-1 are incorrect, doesn't he?</p> <p>17 A. Yes.</p> <p>18 Q. Have you gone back to see whether your numbers</p> <p>19 are correct?</p> <p>20 A. No.</p> <p>21 Q. Okay. You have no basis to dispute his</p> <p>22 conclusion that your numbers are incorrect?</p> <p>23 A. I don't have a basis to evaluate it one way or</p> <p>24 the other, no.</p> <p>25 Q. Okay. Looking at the paragraph on page 24 in</p> <p style="text-align: right;">100</p>

<p>1 your report using 2022 CVAP data -- are you there?</p> <p>2 A. Yes.</p> <p>3 Q. Can you say with confidence sitting here today</p> <p>4 that any of the numbers you report in that paragraph</p> <p>5 are correct?</p> <p>6 A. I thought there was some place in</p> <p>7 Mr. Esselstyn's report where he talked about the CVAP</p> <p>8 estimate for the district itself, I thought we lined</p> <p>9 up, but maybe not. I don't know.</p> <p>10 Let's see. He says on page 7 of his</p> <p>11 report that the 2022 black CVAP for demonstration</p> <p>12 district D is 50.14 percent, which is what I report</p> <p>13 there.</p> <p>14 Q. Okay. Other than the 50.14 percent number in</p> <p>15 that paragraph that lines up with Mr. Esselstyn's</p> <p>16 report, can you say with confidence that any other</p> <p>17 number reported in the paragraph starting using 2022</p> <p>18 CVAP data is accurate?</p> <p>19 A. Well, I know that the error margins are not</p> <p>20 right, but the 50.14 percent is a big deal since</p> <p>21 that's our estimate of the black CVAP for the</p> <p>22 district.</p> <p>23 Q. I'll ask again: Other than the 50.14 number,</p> <p>24 can you say with confidence that any of the other</p> <p>25 numbers you report in the paragraph starting using</p> <p style="text-align: right;">101</p>	<p>1 Q. Okay. So midway through the paragraph you say</p> <p>2 that Mr. Esselstyn's report in black CVAP is</p> <p>3 50.19 percent. Do you see that?</p> <p>4 A. Yes.</p> <p>5 Q. Other than that number, can you say with</p> <p>6 confidence that any of the numbers you provide in this</p> <p>7 paragraph are correct?</p> <p>8 A. Other than 50.19 percent?</p> <p>9 Q. Yes.</p> <p>10 A. (Witness reviewing document.)</p> <p>11 The numbers are not correct, but the</p> <p>12 conclusion that claim overall estimated black CVAP</p> <p>13 percent for the district is above 50 percent is</p> <p>14 dependent on the error rate for the method, et cetera,</p> <p>15 we are in agreement on that.</p> <p>16 Q. So putting aside your failure to use the</p> <p>17 correct formula, you chose to calculate the margin of</p> <p>18 error of the demonstration districts by combining the</p> <p>19 margins of error of all of the block groups that you</p> <p>20 believed were in demonstration districts B and D. Is</p> <p>21 that correct?</p> <p>22 A. That's right. As Dr. Collingwood said, it is</p> <p>23 impossible to calculate the actual error margin for</p> <p>24 the districts.</p> <p>25 Q. All right. Margins of error at the block group</p> <p style="text-align: right;">103</p>
<p>1 2022 CVAP data are accurate?</p> <p>2 A. I'll answer again, I know the error margins are</p> <p>3 incorrect, which by my read are the other numbers</p> <p>4 here. That 50.14 percent number is very important,</p> <p>5 since that's the actual estimate for the black CVAP</p> <p>6 percent of the district. We both agree using 2022</p> <p>7 data that it is 50.14 percent.</p> <p>8 Q. Okay. The final sentence of this paragraph</p> <p>9 says, starts "for 2020 the block groups do have an</p> <p>10 estimated BCVAP above 50 percent (50.2 percent) but</p> <p>11 for 2020 they do not, parentheses (49.5 percent)."</p> <p>12 Do you see that?</p> <p>13 A. Yes.</p> <p>14 Q. Can you say with confidence that those numbers</p> <p>15 are correct?</p> <p>16 A. The specific numbers are not correct, but the</p> <p>17 actual conclusion that for 2020 the block groups do</p> <p>18 not have an estimated BCVAP above 50 percent, but for</p> <p>19 2020 they do not, we are in agreement on that.</p> <p>20 Q. Okay. Let's go back to page 23 of your report,</p> <p>21 sorry to skip around. I want to focus on this</p> <p>22 paragraph that starts at the bottom of 23, crosses</p> <p>23 over to 24, starts "even using 2020 data."</p> <p>24 Are you with me?</p> <p>25 A. Yes.</p> <p style="text-align: right;">102</p>	<p>1 level are going to be higher generally than margins of</p> <p>2 error at the county level. Is that correct?</p> <p>3 A. Not necessarily. I'm sorry, you mean of an</p> <p>4 individual block group? Yeah. Generally speaking the</p> <p>5 error margin of an individual block group will be</p> <p>6 higher than the error margin of a county.</p> <p>7 Q. Okay. The majority of the population in</p> <p>8 districts, demonstration districts B and D would have</p> <p>9 been whole counties, correct?</p> <p>10 A. That's right.</p> <p>11 Q. All right. Because districts B and D only</p> <p>12 split one county?</p> <p>13 A. That's my recollection.</p> <p>14 Q. All right. Census Bureau directly reports</p> <p>15 margin of error at the county level. Isn't that</p> <p>16 correct?</p> <p>17 A. That's correct.</p> <p>18 Q. You could have used the margins of error that</p> <p>19 the Census Bureau reported directly at the county</p> <p>20 level for purposes of counting the, calculating the</p> <p>21 margin of error for the majority of demonstration</p> <p>22 districts B and D. Isn't that correct?</p> <p>23 A. Yeah. I actually thought of this one.</p> <p>24 Q. Then you could have combined the calculation at</p> <p>25 the county level with calculations at the block group</p> <p style="text-align: right;">104</p>

<p>1 level for the portions of the demonstration districts 2 that contained only a partial county. Is that 3 correct? 4 A. Yeah. 5 Q. You considered calculating the margin of error 6 in that way? 7 A. Yeah. I just said that one I actually thought 8 about. 9 Q. Okay. Wouldn't that have been a more accurate 10 way of calculating margin of error? 11 A. So I don't know. The reason I didn't do it 12 that way was I looked at the ACS handbook, I didn't 13 see anything instructing to do it that way. I wasn't 14 sure about mixing and matching different levels of 15 Census subdivisions. So I did it aggregating the 16 block groups, so it was only the block group level. 17 Q. Talking about chapter 8 of the ACS handbook? 18 A. Right. I might have missed it, but I didn't 19 see anything in there saying to always use the largest 20 subdivision available. 21 Q. Okay. In your view is there something in the 22 ACS handbook that suggests that it would be 23 inappropriate to combine margins of error at the 24 county level with margins of error at the block group 25 level?</p> <p style="text-align: right;">105</p>	<p>1 A. Oh, no. No. I did it keeping the same groups 2 across. And I genuinely meant what I said, I was 3 looking for a citation, I'm kind of curious about 4 this, but I didn't see anything in Dr. Collingwood's 5 report saying this is the way you have to do it, 6 either. 7 So at the end of the day it doesn't change 8 the ultimate answer, which is that 50 percent is 9 within the error margin. So I only spent but so much 10 time digging on this, but I never found there was an 11 answer. 12 Q. Okay. Let's turn to Dr. Collingwood's rebuttal 13 report. Let's turn to page 13. 14 A. (Witness complies.) 15 Q. Are you with me? 16 A. Yes. 17 Q. Okay. You see Dr. Collingwood's rebuttal table 18 2? 19 A. Yes. 20 Q. You reviewed this table? 21 A. Yes. 22 Q. Did you identify any errors in the analysis 23 that Dr. Collingwood engaged in to produce this table? 24 A. I didn't look one way or the other. 25 Q. So sitting here today you haven't identified</p> <p style="text-align: right;">107</p>
<p>1 A. No. I didn't see guidance either way on that. 2 Q. Okay. Is there some mathematical reason why it 3 would be inappropriate to combine data at the county 4 level with data at the block group level? 5 MR. STRACH: Objection. 6 Go ahead. 7 A. No. I would just want to see some type of 8 citation or something saying that that's definitely 9 the way you have to do it. 10 Q. Is there a citation -- well, step back. 11 So you chose to aggregate all block 12 groups, right? 13 A. Yes. 14 Q. All right. Is there a citation saying that 15 that's the way it should be done? 16 A. No. I think my testimony has been I don't see 17 a citation either way. So I decided to do it keeping 18 consistent Census levels across what I aggregated 19 from. 20 Q. All right. Let's pull up Dr. Collingwood's 21 rebuttal report. 22 Let me ask you this, actually. Did you 23 ever engage in a calculation of margin of error using 24 the method of combining margins of error for counties 25 with margins of error for block groups?</p> <p style="text-align: right;">106</p>	<p>1 any errors? 2 A. I didn't look one way or the other. 3 Q. I'm just asking, sitting here today you have 4 not identified any errors? 5 A. My answer is still I didn't look one way or the 6 other. 7 I think when you ask an expert if they 8 identified error, it has implicit in it a suggestion 9 that the expert looked. And so I want to clarify that 10 I didn't look one way or the other. I don't know if 11 there are errors in it. But I'm not going to validate 12 the data, either. 13 Q. You are not going to offer an opinion that 14 there were errors in the approach that Dr. Collingwood 15 used to produce this table, are you? 16 A. As I sit here, I don't have an opinion one way 17 or the other. Like I said, I haven't looked at it. 18 Q. All right. So Dr. Collingwood shows in this 19 table that if you -- well, let's take a step back. So 20 you agree that you can use the margins of error 21 directly reported by the Census Bureau at the county 22 level to calculate a margin of error for the black 23 CVAP proportion of each county, correct? 24 A. Well, I think what I said was this is something 25 I considered and looked and didn't find guidance one</p> <p style="text-align: right;">108</p>

<p>1 way or the other. I thought the safest way to proceed</p> <p>2 was to use the same levels across the board. So I</p> <p>3 don't agree or disagree one way or the other.</p> <p>4 Q. With the way Dr. Collingwood calculated margin</p> <p>5 of error?</p> <p>6 A. I don't know if there's a reason to do it or</p> <p>7 not. I figured you would be safe using the same</p> <p>8 Census level across the board in calculating from</p> <p>9 there, rather than mixing up or mixing and matching</p> <p>10 Census levels. I don't know one way or the other if</p> <p>11 that's acceptable or not.</p> <p>12 Q. Why would mixing and matching Census levels</p> <p>13 matter for the equation that we looked at from chapter</p> <p>14 8 of the handbook?</p> <p>15 A. Oh, gosh, I don't know. But as we have gone</p> <p>16 through the weeds here, we have seen all sorts of</p> <p>17 pitfalls that can pop up using this Census data. So</p> <p>18 it's one of those unknown unknowns that made me</p> <p>19 nervous when I was doing this.</p> <p>20 Q. Is the Census level an input into the margin of</p> <p>21 error?</p> <p>22 A. I don't see it, but, like I said, I wasn't</p> <p>23 comfortable putting different levels of Census data in</p> <p>24 for calculating the error margin. I thought it would</p> <p>25 be safer to use the same level across the board.</p> <p style="text-align: right;">109</p>	<p>1 geographically?</p> <p>2 A. No.</p> <p>3 Q. Okay. So when you are combining block groups</p> <p>4 you are combining geographic regions that are of a</p> <p>5 different physical area, correct?</p> <p>6 A. Yes.</p> <p>7 Q. And when you are combining block groups, you</p> <p>8 are combining geographic regions that have different</p> <p>9 populations, correct?</p> <p>10 A. Correct.</p> <p>11 Q. Okay. So stepping away from the question of</p> <p>12 combining different geographic regions for a moment, I</p> <p>13 just want to ask you a basic question about Census</p> <p>14 Bureau's calculation of margins of error at the county</p> <p>15 level.</p> <p>16 So you agree the Census Bureau directly</p> <p>17 reports margins of error at the county level for black</p> <p>18 CVAP and total CVAP, correct?</p> <p>19 A. Correct.</p> <p>20 Q. And you use those margins of error to directly</p> <p>21 calculate margin of error for black CVAP proportion,</p> <p>22 correct?</p> <p>23 A. Correct.</p> <p>24 Q. Okay. So, in other words, the black CVAP</p> <p>25 percentage margin of error at each county -- let me</p> <p style="text-align: right;">111</p>
<p>1 I haven't seen any instruction one way or</p> <p>2 another in the Census data. There's no citation in</p> <p>3 Dr. Collingwood's work, so I can't say one way or</p> <p>4 another that it is safe to use what Dr. Collingwood</p> <p>5 does. I'm not disputing it, either. I just don't</p> <p>6 know.</p> <p>7 Q. The margin of error formula doesn't know that a</p> <p>8 particular region is a block group, correct?</p> <p>9 A. No.</p> <p>10 Q. Can you think of any reason why it would be</p> <p>11 appropriate to combine a block group with another</p> <p>12 block group, but not combine a block group with a</p> <p>13 county for purposes of the margin of error formula?</p> <p>14 MR. STRACH: Objection.</p> <p>15 A. You can ask me this as many ways as you want,</p> <p>16 but the answer is going to be the same. I don't know</p> <p>17 one way or another.</p> <p>18 The whole point is that there's a lot of</p> <p>19 pitfalls in the Census data and it seems safe to me to</p> <p>20 use the same level across the board. I don't see any</p> <p>21 citation one way or the other suggesting you ought not</p> <p>22 do it that way.</p> <p>23 Q. Okay.</p> <p>24 A. I don't know.</p> <p>25 Q. Are all block groups the same size</p> <p style="text-align: right;">110</p>	<p>1 start again.</p> <p>2 In other words, the black CVAP percentage</p> <p>3 margin of error for each county is known?</p> <p>4 A. Yes.</p> <p>5 Q. Okay. Dr. Collingwood in his rebuttal table 2</p> <p>6 shows that your method of combining block groups if</p> <p>7 applied at the county level would produce margins of</p> <p>8 error that are significantly higher than the known</p> <p>9 black CVAP percentage margin of error reported by</p> <p>10 Census Bureau at the county level. Isn't that true?</p> <p>11 A. That's what it suggests, yeah.</p> <p>12 Q. You have no reason to dispute that?</p> <p>13 A. I don't.</p> <p>14 Q. Okay. So, for example, his rebuttal table 2</p> <p>15 shows under your method of combining block groups, you</p> <p>16 would get a margin of error for the black CVAP</p> <p>17 percentage in Bertie County of plus or minus 4.4</p> <p>18 percentage points after adjusting for your coding</p> <p>19 errors. Is that right?</p> <p>20 A. I think that's right.</p> <p>21 Q. Okay. The Census Bureau directly reports a</p> <p>22 margin of error of plus or minus .72 percent. Is that</p> <p>23 right?</p> <p>24 A. Right.</p> <p>25 Q. Okay. For every single county that</p> <p style="text-align: right;">112</p>

<p>1 Dr. Collingwood analyzed in rebuttal table 2, you get 2 the same result that your method of combining block 3 groups produces margins of error that are higher than 4 the margins of error directly reported for counties by 5 the Census Bureau. Is that correct?</p> <p>6 A. Well, that's right.</p> <p>7 Q. Okay. Doesn't that suggest to you that your 8 method for calculating margins of error inflates the 9 margin of error?</p> <p>10 A. Well, I don't know. This is a nice example of 11 what I was kind of suggesting about unknown unknowns 12 before. I think on a spatial level if I suggested 13 calculating everything from the block group level to 14 keep things consistent across your levels of 15 estimation, spatially there wouldn't be anything wrong 16 with that. Dr. Collingwood suggests this as a 17 potential shortcoming.</p> <p>18 I don't know if there are shortcomings 19 going the other direction, using county level 20 groupings to estimate things and then combining with 21 block group groupings. I just don't know. We are 22 both estimating from reported Census data.</p> <p>23 Q. All right. Let's flip to the --</p> <p>24 A. If we are going to a new topic, can I suggest 25 lunch? I think ours is probably getting cold.</p> <p style="text-align: right;">113</p>	<p>1 his rebuttal table 2 is that if you sum the margins of 2 error for each individual block group you will get a 3 higher margin of error than you would get for the 4 entire region containing those block groups. Is that 5 true?</p> <p>6 MR. STRACH: Objection.</p> <p>7 A. You will get a larger error margin in these 8 counties that he investigates than summing the block 9 groups. I don't know how far that generalizes.</p> <p>10 Q. You mean you get a larger margin of error by 11 summing the block groups than you do if you take the 12 margin of error for the county containing the block 13 groups?</p> <p>14 MR. STRACH: Objection.</p> <p>15 A. For the counties he looks at. Again, this 16 transcript follows me. I don't know if this is a 17 generalizable principle that he's identified or not. 18 That's true of the 10 counties he looks at.</p> <p>19 Q. One of the counties he looks at is Pasquotank 20 County, right?</p> <p>21 A. Yes.</p> <p>22 Q. Okay. So if you add up the margin of error for 23 the block groups in a portion of Pasquotank County, 24 you are likely to get a higher margin of error than 25 the true margin of error for that portion of</p> <p style="text-align: right;">115</p>
<p>1 Q. Sure. We're sort of related, but this is a 2 fine place to break.</p> <p>3 A. I don't have a problem wrapping up.</p> <p>4 Q. Probably have about half a page more questions 5 on sort of a related topic. Totally up to you?</p> <p>6 A. That's fine. I've just been informed reliably 7 by counsel that Panera is running slow today, so it is 8 actually not getting cold.</p> <p>9 Q. Okay. All right.</p> <p>10 Let's flip to page 33 of your report.</p> <p>11 A. (Witness complies.)</p> <p>12 Q. Do you have an understanding of whether the 13 majority of the population of Pasquotank County falls 14 in Mr. Esselstyn's demonstration districts rather than 15 the adjoining district?</p> <p>16 A. I don't, but I would suspect it's the majority.</p> <p>17 Q. Okay. Do you agree that the actual margin of 18 error for the black CVAP proportion of a region 19 containing, say, 20 block groups will be lower than 20 the margin of error you get if you were to sum the 21 margins of error for each of those 20 block groups?</p> <p>22 MR. STRACH: Objection.</p> <p>23 A. I have no idea what you just asked. I'm sorry.</p> <p>24 Q. Okay. Well, let me try to rephrase.</p> <p>25 So what Dr. Collingwood demonstrates in</p> <p style="text-align: right;">114</p>	<p>1 Pasquotank County. Is that true?</p> <p>2 MR. STRACH: Objection.</p> <p>3 A. No. Neither Dr. Collingwood, nor I can make 4 that claim.</p> <p>5 Inflated variance could come from a part 6 outside the district. We just don't know. I should 7 say any inflated variance could come from outside the 8 district, we just don't know.</p> <p>9 Q. So you're saying it is possible that the 10 inflated variance of the margin of error is entirely 11 attributable to block groups that are outside of the 12 demonstration district?</p> <p>13 MR. STRACH: Objection.</p> <p>14 Go ahead.</p> <p>15 A. Yeah, I'm saying we don't know. Any inflated 16 variance could be attributable to the part that's 17 outside the district.</p> <p>18 Q. Any reason to think that would be the case?</p> <p>19 MR. STRACH: Objection.</p> <p>20 A. No. We don't know means we don't know. We 21 just don't know where any inflated variance is coming 22 from.</p> <p>23 We have a sample of 10 counties that he's 24 looked at of the 3,000 plus in the United States, so I 25 don't know if this is like a generalized issue or</p> <p style="text-align: right;">116</p>

<p>1 something that is very specific to this portion of 2 North Carolina, or within this portion of North 3 Carolina, if it is, you know, a rural versus urban 4 thing. I just don't know.</p> <p>5 So, no, we can't make that claim. I don't 6 think Dr. Collingwood makes it either, unless I missed 7 it. I might have.</p> <p>8 Q. So you don't think you can infer a general 9 principle from this rebuttal table 2 that if you sum 10 up margins of error for subgroups within a region, the 11 margin of error is likely to be higher than for the 12 region itself?</p> <p>13 MR. STRACH: Objection.</p> <p>14 Go ahead.</p> <p>15 A. I don't know. You certainly can't do it on the 16 basis of 10 counties.</p> <p>17 Q. Okay.</p> <p>18 A. We're ultimately all estimating the final 19 variance. I don't know if the estimation formula is 20 conservative or not.</p> <p>21 Q. Can you look at page 18 of your report?</p> <p>22 A. (Witness complies.)</p> <p>23 Q. You say on page 18: "However, because the 24 population of the district is smaller than the 25 population for all the block groups in the district</p> <p style="text-align: right;">117</p>	<p>1 margin of the district and generally speaking error 2 margins are related to the population. The 3 traditional formula for the error margin is whatever 4 your Z statistic is times the square root of the 5 variance over the number of observations. So as you 6 pull people out, that denominator gets smaller and 7 your error margin increases.</p> <p>8 But it is possible that as you pull people 9 out, you are altering the numerator as well, because 10 the variance will change enough. It is possible I 11 suppose that it changes enough to offset the changes 12 in numerator, which is why I leave that wiggle room 13 there.</p> <p>14 But generally speaking error margins are a 15 function of the number of people in your sample.</p> <p>16 Q. Okay. The number of people in the sample is 17 different than the population of the block group. 18 Isn't that true?</p> <p>19 A. Well, no, because here the CVAP, we are talking 20 about the CVAP and that is something that's estimated. 21 It is your N.</p> <p>22 Q. Right. But the error margins, when you say 23 error margin are inversely related to population, you 24 mean the error margins are inversely related to the 25 number of responses for that particular block group in</p> <p style="text-align: right;">119</p>
<p>1 and because error margins are inversely related to 2 population, the actual error margin for the district 3 will likely be somewhat larger."</p> <p>4 Do you see that?</p> <p>5 A. Yes.</p> <p>6 Q. You have no way to know whether that's true, do 7 you?</p> <p>8 A. No.</p> <p>9 Q. Okay.</p> <p>10 A. But the only reason that I don't have a way to 11 know that, it is generally true that as you eliminate 12 observations, your error margins grow.</p> <p>13 There's a little slight caveat in there 14 that it is related to the variance.</p> <p>15 Now, for proportion, that's different, 16 because the variance is the proportion. But when you 17 are doing count data, you need to know the variance of 18 the count data. So it is possible that as you 19 eliminate population expanding the error margins, you 20 have made a change to the variance as well that 21 counteracts that change.</p> <p>22 Q. I just want to -- did you look at error margins 23 for block groups in Pasquotank County to verify that 24 the error margins are inversely related to population?</p> <p>25 A. Well, here we are talking about the error</p> <p style="text-align: right;">118</p>	<p>1 the ACS survey, don't you?</p> <p>2 A. Well, right. But it is important to remember 3 that in the ACS, that's an estimate as well. That's 4 why we are sitting here. So when we are talking in 5 the context of CVAP, population that we are talking 6 about is all being estimated. The N is an estimate. 7 That's part of why you get this complicated formula 8 for the error margins, because both your denominator 9 and numerator are estimates.</p> <p>10 Q. I just want to understand the statement you 11 make on page 18. You say: "However, because the 12 population of the district is smaller than the 13 populations for all the block groups in the district 14 and because error margins are inversely related to 15 population, the actual error margin for the district 16 will likely be somewhat larger."</p> <p>17 And you didn't do anything to verify that 18 the error margins for block groups in Pasquotank 19 County are inversely related to the population of 20 block groups in Pasquotank County, did you?</p> <p>21 MR. STRACH: Objection.</p> <p>22 Go ahead.</p> <p>23 A. Yeah, I think I've answered this a couple 24 different ways. I think I understand getting hung up 25 on the term population, which normally when we are</p> <p style="text-align: right;">120</p>

<p>1 doing this stuff we are talking about the Decennial 2 Census numbers.</p> <p>3 We are not talking about Decennial Census 4 numbers now. We are talking about ACS data here. The 5 population through the ACS data, the number of 6 citizens, which is our denominator, is itself 7 estimated, which is part of why you have this 8 complicated formula for the error margins.</p> <p>9 I think that's where we're getting hung up 10 is mixing and matching population as reported by the 11 Decennial Census with population as reported by the 12 CVAP.</p> <p>13 Q. I just want to know what work did you do to 14 verify the statement that error margins are inversely 15 related to population in block groups in Pasquotank 16 County?</p> <p>17 A. Because error margins are inversely related to 18 population. The number of people in your sample is 19 part of the denominator of the error margin 20 calculation.</p> <p>21 Q. Can you go to rebuttal table 3 on page 15 of 22 Dr. Collingwood's rebuttal report?</p> <p>23 A. Okay.</p> <p>24 Q. You understand that this is a table that 25 calculates margin of error for black CVAP percentage</p> <p style="text-align: right;">121</p>	<p>1 A. Yes.</p> <p>2 Q. Okay. So the first block group has a lower 3 population than the second block group. Is that 4 right?</p> <p>5 A. Lower estimated population, yes.</p> <p>6 Q. Okay. It also has a lower estimated margin of 7 error. Is that true?</p> <p>8 A. Yes.</p> <p>9 Q. Okay. So that's inconsistent with your 10 conclusion that error margins are inversely related to 11 population for the block groups in Pasquotank County, 12 isn't it?</p> <p>13 MR. STRACH: Objection.</p> <p>14 A. No, because they are inversely related. 15 There's also a numerator, which is the variance, which 16 is why I don't say conclusively that the error margins 17 will be smaller. I just say likely.</p> <p>18 Q. The numerator is black CVAP, right?</p> <p>19 A. It is the variance, I think.</p> <p>20 Q. What's the variance?</p> <p>21 A. It's the spread of the data. How far from the 22 mean the data tend to be.</p> <p>23 Q. You are saying the variance is the numerator in 24 what proportion?</p> <p>25 A. When the Census is calculating the error</p> <p style="text-align: right;">123</p>
<p>1 using data at the county level and then data at the 2 block group level for Pasquotank, because Pasquotank 3 is split. Is that right?</p> <p>4 A. Correct.</p> <p>5 Q. Okay. Do you see the block groups listed near 6 this table?</p> <p>7 A. Yes.</p> <p>8 Q. All right. You see the first block group has a 9 total CVAP population of 890 people?</p> <p>10 A. Let me bring this up on my computer screen. 11 I'm not trying to filibuster. I can 12 actually increase the size on my computer.</p> <p>13 All right. This is much better. Okay. 14 Where are we?</p> <p>15 Q. You see the first block group listed in this 16 table has a total CVAP of 890 people?</p> <p>17 A. That's estimate, yes.</p> <p>18 Q. Okay. The second block group listed has a 19 total CVAP estimate of 965 people?</p> <p>20 A. That's right.</p> <p>21 Q. Okay. Do you see that the margin of error for 22 CVAP for that second block group is 305?</p> <p>23 A. Yes.</p> <p>24 Q. Margin of error for the CVAP for the first 25 block group is 174?</p> <p style="text-align: right;">122</p>	<p>1 margins for -- well, so let's go straight to formula 2 6. You have, the margin of error for p-hat is 1 over 3 Y. So that's the fraction for total population is on 4 the bottom. And then it is the margin of error for, 5 that's squared for x-hat minus the point estimate 6 squared, which is fraction times the margin of error 7 for y-hat squared. So those error margins are related 8 to variance.</p> <p>9 Now, if we had chapter 7 I think, 10 generally speaking the error margin for count data is 11 your Z statistic times the square root of the variance 12 over the number of observations. So when you're using 13 count data, it's a twofold, there's two parts to it. 14 There is your number of observations, estimate of 15 CVAP, and then the variance. So what's happening here 16 is some of those block groups probably have a greater 17 variance, which is why they have the larger error 18 margins.</p> <p>19 Q. All right. I want to look at the third block 20 group you see that is listed, the third block group in 21 rebuttal table 3 has a black CVAP of 525. Do you see 22 that?</p> <p>23 A. Yes.</p> <p>24 Q. Okay. Do you see that the margin of error for 25 the black CVAP proportion is 237.45?</p> <p style="text-align: right;">124</p>

<p>1 A. Yes.</p> <p>2 Q. All right. Next block group has a black CVAP</p> <p>3 of 290. Do you see that?</p> <p>4 A. Yes.</p> <p>5 Q. The margin of error for the black CVAP estimate</p> <p>6 is 219.45?</p> <p>7 A. Yes.</p> <p>8 Q. All right. So, again, here a block group in</p> <p>9 Pasquotank County with a lower black CVAP has a lower</p> <p>10 margin of error than the block group with the higher</p> <p>11 black CVAP. Isn't that true?</p> <p>12 A. Yeah, probably has lower variance --</p> <p>13 Q. Okay.</p> <p>14 A. -- which is going to happen as you approach</p> <p>15 zero, too. I mean, there's no way that the district</p> <p>16 with N of 40 is going to have a variance of 700, for</p> <p>17 obvious reasons.</p> <p>18 Q. Okay. So these error margins are not inversely</p> <p>19 related to population, correct?</p> <p>20 A. Error margins are inversely related to</p> <p>21 population. But there's also a denominator in there</p> <p>22 that can overwhelm the change in the number of</p> <p>23 observations, which is why I say likely. I don't say</p> <p>24 definitely.</p> <p>25 Q. The error margins that we just looked at in</p> <p style="text-align: right;">125</p>	<p>1 variances than the portions that are outside the</p> <p>2 demonstration districts, correct?</p> <p>3 A. No. None of us can do that. It is impossible,</p> <p>4 because only the Census has those individual responses</p> <p>5 that you can calculate variances from.</p> <p>6 Q. Okay.</p> <p>7 MS. THEODORE: This is a good place to</p> <p>8 break for lunch.</p> <p>9 (Recess taken.)</p> <p>10 BY MS. THEODORE:</p> <p>11 Q. So before we move off Dr. Collingwood, we were</p> <p>12 talking about rebuttal table 2. I just want to ask</p> <p>13 you more generally: Do you have a basis to dispute</p> <p>14 any of the data or analysis in Dr. Collingwood's</p> <p>15 rebuttal report?</p> <p>16 MR. STRACH: Objection.</p> <p>17 A. Well, I mean, there's -- I think I testified</p> <p>18 early on that I didn't read the whole thing, so -- or</p> <p>19 I didn't pay close attention to the whole thing. I</p> <p>20 know there's part of it responding to another expert,</p> <p>21 Dr. Alford that I didn't read at all.</p> <p>22 But I think generally speaking I agree</p> <p>23 with his data.</p> <p>24 Q. Are you disputing any conclusion in his</p> <p>25 rebuttal report?</p> <p style="text-align: right;">127</p>
<p>1 rebuttal table 3 are not inversely related to</p> <p>2 population, are they?</p> <p>3 A. Yes, they are. They just have a denominator as</p> <p>4 well that is the variance, which overwhelms the effect</p> <p>5 of the number of observations.</p> <p>6 But the formula for error margins has the</p> <p>7 number of observations in the denominator, which is</p> <p>8 why they are inversely related. There are other</p> <p>9 effects that can overwhelm that, though, like an</p> <p>10 increase in the variance.</p> <p>11 Q. If a portion of a block group that is excluded</p> <p>12 from a demonstration district has fewer responses on</p> <p>13 the American Community Survey than the portion of the</p> <p>14 block group that is included in the demonstration</p> <p>15 district, the true margin of error for the included</p> <p>16 portion might actually be lower than the margin of</p> <p>17 error for the entire block group. Is that true?</p> <p>18 MR. STRACH: Objection.</p> <p>19 A. Depending on what happens with the variance of</p> <p>20 the remaining portion. Generally speaking, no. But</p> <p>21 if the portion that remains has a much lower variance,</p> <p>22 you could end up with a lower error margin.</p> <p>23 Q. Okay. And you didn't do any work in this case</p> <p>24 to determine whether the portions of block groups that</p> <p>25 are in the demonstration districts have lower</p> <p style="text-align: right;">126</p>	<p>1 A. Well, like I said, I don't really know one way</p> <p>2 or another on the, calculating the error margin from</p> <p>3 counties versus block groups. I'm not saying that to</p> <p>4 be disruptive or ornery. I'm saying I really don't</p> <p>5 know. I'm actually kind of curious and would love to</p> <p>6 see citation on that.</p> <p>7 But, no. Generally speaking I think we</p> <p>8 are on the same page.</p> <p>9 Q. Okay.</p> <p>10 A. I guess -- well, looking through it, he has a</p> <p>11 dot plot analysis.</p> <p>12 Q. Dr. Trende, we are going to get to that. Why</p> <p>13 don't we just say excluding the dot plot analysis, are</p> <p>14 you disputing any conclusion in Dr. Collingwood's</p> <p>15 report?</p> <p>16 A. Yeah, I think we are generally on the same</p> <p>17 page. Can I just say I'm incorporating by reference</p> <p>18 whatever the answers are to Mr. Esselstyn's dot plot</p> <p>19 analysis to Dr. Collingwood?</p> <p>20 Q. You can say whatever you like, Dr. Trende.</p> <p>21 All right. Let's move on. What is a</p> <p>22 normal distribution?</p> <p>23 A. Do you want the definition of probability</p> <p>24 density function? Or, as I recall, it is one over the</p> <p>25 square root of two pie times the standard deviation,</p> <p style="text-align: right;">128</p>

<p>1 exponentiated negative X minus mu squared over 2</p> <p>2 variance, I think.</p> <p>3 Q. Okay. When the Census Bureau is calculating a</p> <p>4 margin of error for a black CVAP proportion, that</p> <p>5 margin of error is based on a normal distribution. Is</p> <p>6 that correct?</p> <p>7 A. Yeah. I think that's right. I certainly</p> <p>8 recognize the formula from that.</p> <p>9 Q. Okay.</p> <p>10 A. I don't think I've ever seen them actually come</p> <p>11 out and say that, but maybe they do.</p> <p>12 Q. In a normal distribution 50 percent of the</p> <p>13 values are higher than the point estimate and</p> <p>14 50 percent of the values are lower than the point</p> <p>15 estimate. Is that true?</p> <p>16 A. Yes.</p> <p>17 Q. Okay. So if a point estimate is above</p> <p>18 50 percent, is it true as a statistical matter that is</p> <p>19 more likely than not that the true value of the --</p> <p>20 I'll start again.</p> <p>21 If the point estimate for black CVAP is</p> <p>22 above 50 percent, isn't it true as a statistical</p> <p>23 matter that it is more likely than not that the true</p> <p>24 value of the black CVAP is above 50 percent?</p> <p>25 MR. STRACH: Objection.</p> <p style="text-align: right;">129</p>	<p>1 Politics averages work, because we get multiple polls</p> <p>2 and it can give us a better view of what the true</p> <p>3 population value is by estimating -- by averaging</p> <p>4 those point estimates. Or 538, if you prefer them.</p> <p>5 Q. All right. To put this in more concrete terms,</p> <p>6 if the point estimate is 50.5, and you assume a normal</p> <p>7 distribution for margin of error, if you did 100 runs</p> <p>8 of the ACS survey, 50 of those runs would be above</p> <p>9 what number?</p> <p>10 A. The true population. If the true population</p> <p>11 were 50.5, and you ran the ACS 100 times in</p> <p>12 expectation, 50 of those poll results would be above</p> <p>13 50.5; 50 of those poll results would be below it.</p> <p>14 If true population were 49.5 percent, and</p> <p>15 you run the ACS 100 times, 50 percent of those poll</p> <p>16 results would be above 49.5 percent, 50 percent will</p> <p>17 be below.</p> <p>18 You are making -- this line of inquiry is</p> <p>19 making the classic mistake of frequentism, which is</p> <p>20 assuming that the -- you are trying to make statements</p> <p>21 about the likelihood of the true population value and</p> <p>22 you're not. You're making statements about the</p> <p>23 likelihood of getting this type of result, given a</p> <p>24 certain population value.</p> <p>25 All the error margin means is that if you</p> <p style="text-align: right;">131</p>
<p>1 A. No.</p> <p>2 Q. Why not?</p> <p>3 A. Because what's normally distributed are the</p> <p>4 responses around the true population value, not the</p> <p>5 true population value around the responses. If we</p> <p>6 took 100 polls, those polls would be normally</p> <p>7 distributed around the true population values. So if</p> <p>8 the Census, if the Census repeated this 100 times, the</p> <p>9 BCVP estimates would be normally distributed around</p> <p>10 the true population value. It's a common mistake.</p> <p>11 Q. Okay.</p> <p>12 MS. THEODORE: Can you read back that</p> <p>13 explanation, Mr. Bailey?</p> <p>14 (The record was read back as requested.)</p> <p>15 BY MS. THEODORE:</p> <p>16 Q. So you are saying if the Census repeated the</p> <p>17 ACS 100 times, 50 percent of those values would be</p> <p>18 above the point estimate?</p> <p>19 A. No. In expectation, which is an important</p> <p>20 caveat, 50 percent of those poll values would be above</p> <p>21 the true population value. So 50 percent of the -- if</p> <p>22 you took 100 polls in expectation, 50 point estimates</p> <p>23 would be above the true population value, and 50 point</p> <p>24 estimates would be below the true population value.</p> <p>25 That's why something like the RealClear</p> <p style="text-align: right;">130</p>	<p>1 repeat -- all a 90 percent confidence interval means</p> <p>2 is if you repeated the poll 100 times, 90 percent of</p> <p>3 those error margins would contain the true population</p> <p>4 value somewhere within them. We don't know where and</p> <p>5 we can't say where is more likely than not within</p> <p>6 those confidence levels.</p> <p>7 The answer that it gives you some idea</p> <p>8 about the likelihood or the probability of a true</p> <p>9 population value is one of those failure statistic</p> <p>10 comps answers.</p> <p>11 Q. So with respect to a point estimate that's 50.5</p> <p>12 let's say, and let's suppose that the margin of error</p> <p>13 at the 90 percent confidence interval is .4, what</p> <p>14 statistical statement do you make there about the</p> <p>15 likelihood that the true value is above 50 percent?</p> <p>16 A. I can say we have -- oh, that it's above 50</p> <p>17 percent? If we are going to accept 90 percent</p> <p>18 confidence, P value of .1 as sufficient, then you</p> <p>19 would say you have, these data are sufficiently</p> <p>20 inconsistent with the true population value being</p> <p>21 50 percent, that we would reject that possibility and</p> <p>22 accept the hypothesis that it is higher.</p> <p>23 Or you could say, you know, 90 percent of</p> <p>24 the time, since 90 percent of the time that confidence</p> <p>25 interval is going to include the true population</p> <p style="text-align: right;">132</p>

<p>1 value, we can have a pretty high degree of confidence</p> <p>2 that the true population value is somewhere between</p> <p>3 50.1 and 50.9.</p> <p>4 Q. Okay. You say on page 24, footnote 9 of your</p> <p>5 report that "most social science journals still</p> <p>6 require 95 percent confidence to support a claim."</p> <p>7 Do you see that?</p> <p>8 A. Yes.</p> <p>9 Q. What work did you do to support the conclusion</p> <p>10 that most social science journals require 95 percent</p> <p>11 confidence?</p> <p>12 A. I'm sorry, which footnote are we in?</p> <p>13 Q. You know what I may --</p> <p>14 A. This is what I get for trusting the lawyers.</p> <p>15 Q. It is the last sentence of footnote 9, page 24.</p> <p>16 A. Okay. Yeah, most social science results that I</p> <p>17 see reported are to 95 percent confidence. So</p> <p>18 sometimes you will see them reported to 90 percent as</p> <p>19 a finding, but it is generally 95 percent.</p> <p>20 Q. This is just based on your review of articles</p> <p>21 in social science journals, you have seen a lot that,</p> <p>22 where numbers are reported at 95 percent?</p> <p>23 A. It is my experience. I mean, as someone who</p> <p>24 has been through grad school fairly recently and</p> <p>25 watched a lot of people trying to get results</p> <p style="text-align: right;">133</p>	<p>1 Mr. Esselstyn complies with those redistricting</p> <p>2 criteria, correct?</p> <p>3 A. Yeah, I think that's right.</p> <p>4 Q. Okay. Similarly, your report doesn't offer any</p> <p>5 opinion as to whether any demonstration map drawn by</p> <p>6 Mr. Esselstyn complies with the redistricting</p> <p>7 criteria?</p> <p>8 A. That's right.</p> <p>9 Q. Okay. You don't dispute that every</p> <p>10 demonstration district drawn by Mr. Esselstyn is as</p> <p>11 compact or more compact than the enacted Senate</p> <p>12 districts 1 and 2, correct?</p> <p>13 A. I haven't looked at it one way or the other, so</p> <p>14 I don't dispute it or affirm it.</p> <p>15 Q. Okay. Similarly, you don't dispute that every</p> <p>16 demonstration map drawn by Mr. Esselstyn is as compact</p> <p>17 or more compact than the enacted 2023 Senate map,</p> <p>18 correct?</p> <p>19 A. I haven't looked at it one way or the other, so</p> <p>20 I don't dispute it or not dispute it.</p> <p>21 Q. You are not offering any opinions about</p> <p>22 compactness in this case, are you?</p> <p>23 A. I don't believe so.</p> <p>24 Q. Okay. Your report doesn't offer any opinion</p> <p>25 about whether any of Mr. Esselstyn's demonstration</p> <p style="text-align: right;">135</p>
<p>1 published, and submitted stuff myself, you are going</p> <p>2 for 95 percent confidence. But sometimes you can get</p> <p>3 stuff published with 90 percent. I'm not really aware</p> <p>4 of results being published below that, but maybe they</p> <p>5 exist somewhere.</p> <p>6 Q. You didn't do any sort of quantitative analysis</p> <p>7 to conclude that most social science journals require</p> <p>8 95 percent?</p> <p>9 A. No. It is based on my experience.</p> <p>10 Q. Okay. You reviewed demonstration districts A</p> <p>11 through D described in Mr. Esselstyn's initial report?</p> <p>12 A. Correct.</p> <p>13 Q. You agree that demonstration district A and C</p> <p>14 are majority black districts?</p> <p>15 A. I think that's right, yes, because they cross</p> <p>16 the ballot threshold.</p> <p>17 Q. Okay. Are you aware that the North Carolina</p> <p>18 legislature announced a set of redistricting criteria</p> <p>19 when it drew the new legislative maps in 2023?</p> <p>20 A. Yes.</p> <p>21 Q. Okay. Your report doesn't cite those criteria</p> <p>22 or rely on them. Is that correct?</p> <p>23 A. Correct.</p> <p>24 Q. Okay. So your report doesn't offer any opinion</p> <p>25 as to whether any demonstration district drawn by</p> <p style="text-align: right;">134</p>	<p>1 districts are reasonably configured, correct?</p> <p>2 A. I don't know if that's in there or not. I</p> <p>3 don't think so.</p> <p>4 Q. Okay.</p> <p>5 A. Reasonably configure is like a legal term of</p> <p>6 art. There might be things that relate to that as a</p> <p>7 legal term of art, but in my mind, no.</p> <p>8 Q. Okay. Same with the maps, your report doesn't</p> <p>9 offer any opinion as to whether any demonstration map</p> <p>10 is reasonably configured. Is that correct?</p> <p>11 A. Yes. It's the same answer. Reasonably</p> <p>12 configure is a legal term of art. So I don't know how</p> <p>13 opinions I offer might relate to it, but in my mind,</p> <p>14 no.</p> <p>15 Q. Did you review Mr. Esselstyn's demonstration</p> <p>16 district E in his rebuttal report?</p> <p>17 A. No.</p> <p>18 Q. So you haven't formed any opinions about</p> <p>19 demonstration district E?</p> <p>20 A. I have not.</p> <p>21 Q. All right. On page 25 you discuss</p> <p>22 Mr. Esselstyn's demonstration district A, correct?</p> <p>23 A. Yes.</p> <p>24 Q. All right. You say, "because every county in</p> <p>25 the district has at least 2,364 black residents of</p> <p style="text-align: right;">136</p>

<p>1 voting age, all counties in the map are required to</p> <p>2 achieve a majority black district."</p> <p>3 Did I read that correctly?</p> <p>4 A. Yeah, that one probably could have been</p> <p>5 wordsmithed a little better, but yes.</p> <p>6 Q. What did you mean by that sentence?</p> <p>7 A. I didn't mean that was the only configuration</p> <p>8 in the region that could possibly be done. I meant</p> <p>9 that you had to look at the black population in every</p> <p>10 one of the counties within the district as drawn to</p> <p>11 get to 50 percent plus 1.</p> <p>12 So this dates back to my testimony in the</p> <p>13 Nairne case where I used something called the moment</p> <p>14 of inertia approach, and in that case I used it</p> <p>15 because there were districts that were drawn up to</p> <p>16 like 58 percent BVAP. And so you could make a case,</p> <p>17 looking at the distribution of the entire black</p> <p>18 population was unfair, because there might be a small</p> <p>19 concentrated version in the city that would get you to</p> <p>20 50 percent plus 1.</p> <p>21 So all I'm trying to say here is that for</p> <p>22 these districts as constituted, pretty much every</p> <p>23 black individual in the districts are needed to get to</p> <p>24 50 percent plus 1.</p> <p>25 Q. Demonstration district A has a BVAP of</p> <p style="text-align: right;">137</p>	<p>1 residents, for purposes of population compactness you</p> <p>2 would only have to look at the black population in</p> <p>3 Vance County, because on its own that population is</p> <p>4 sufficient to be 50 percent plus 1 of the voting age</p> <p>5 population in that district as a whole. So I think it</p> <p>6 would be unfair to plaintiffs to look at the</p> <p>7 distribution across Vance and Bertie Counties.</p> <p>8 Q. Okay.</p> <p>9 A. But that's not the case here. The black</p> <p>10 population that gets you to 50 percent plus 1 is</p> <p>11 necessarily spread across all of these counties.</p> <p>12 Q. All right. You are not offering a moment of</p> <p>13 inertia analysis in this case, correct?</p> <p>14 A. No.</p> <p>15 Q. All right. Okay. Then you say later in the</p> <p>16 same paragraph that "if counties were to split, which</p> <p>17 I understand to violate the Stephenson Rule, only</p> <p>18 three precincts at the eastern end of Washington</p> <p>19 County could be removed while maintaining a BVAP of</p> <p>20 50 percent or two precincts at the western tip of</p> <p>21 Vance County could be removed."</p> <p>22 Did I read that correctly?</p> <p>23 A. Correct.</p> <p>24 Q. All right. What work did you do to reach the</p> <p>25 conclusion that those were the only precincts that</p> <p style="text-align: right;">139</p>
<p>1 51.47 percent?</p> <p>2 A. Right.</p> <p>3 Q. Your view is that every, pretty much every</p> <p>4 black person is needed to get above 50 percent plus 1?</p> <p>5 A. You can exclude from your analysis I guess</p> <p>6 440 -- I'm sorry, that's not right -- 1240, give or</p> <p>7 take. And since every county has at least 2,364</p> <p>8 residents, black residents of voting age, you need</p> <p>9 some population from every county.</p> <p>10 I guess what I'm saying is if this</p> <p>11 district were 70 percent BVAP, let's say, you wouldn't</p> <p>12 necessarily have to look at the whole county to</p> <p>13 identify the black population that is sufficient to</p> <p>14 constitute 50 percent plus 1. You know, you might</p> <p>15 say, well, you only need the black population within</p> <p>16 this district in one county to reach that threshold.</p> <p>17 But that's not the case here.</p> <p>18 Q. Okay. It is also true that you couldn't delete</p> <p>19 one of these counties while still meeting the total</p> <p>20 population threshold, correct?</p> <p>21 A. Right. What I'm saying -- well, let's try this</p> <p>22 a different way. If every black resident of the</p> <p>23 county, except maybe 20, let's say you had 20 black</p> <p>24 residents in Bertie County, everyone else is in Vance</p> <p>25 County, and then the other counties had zero black</p> <p style="text-align: right;">138</p>	<p>1 could be removed?</p> <p>2 A. Well, again, if you are looking at the, if you</p> <p>3 are thinking of this in terms of population</p> <p>4 compactness, which is what I'm thinking in terms of,</p> <p>5 you way, okay, could things be snipped off of either</p> <p>6 end -- I suppose there's black populations that could</p> <p>7 be snipped out of the center, which doesn't really</p> <p>8 make the black population more compact. So I just</p> <p>9 looked at the precincts in the two counties at the</p> <p>10 ends and looked to see how many precincts could be</p> <p>11 removed before the black population fell below</p> <p>12 50 percent.</p> <p>13 Q. All right. Let's turn to page 60 of</p> <p>14 Mr. Esselstyn's rebuttal report, which I believe we</p> <p>15 marked as Exhibit 12.</p> <p>16 A. (Witness complies.)</p> <p>17 Page what?</p> <p>18 Q. Sorry. Page 60 of the PDF. Are you looking at</p> <p>19 a hard copy?</p> <p>20 A. Yeah, but I can bring up the PDF.</p> <p>21 Okay.</p> <p>22 Q. You see he demonstrates here that precincts</p> <p>23 could be removed from Hertford County without dropping</p> <p>24 the BVAP in demonstration district A below 50 percent?</p> <p>25 A. Yeah. Like I said, that doesn't help the</p> <p style="text-align: right;">140</p>

<p>1 population compactness. I was just looking at the</p> <p>2 ones at the ends.</p> <p>3 Q. You see he also shows that a precinct could be</p> <p>4 removed from Bertie County without dropping the BVAP</p> <p>5 in demonstration district A below 50 percent?</p> <p>6 A. Like I said, that doesn't help the population</p> <p>7 compactness, because you're taking a chunk out of the</p> <p>8 middle of the district. That's why I only looked at</p> <p>9 the ends.</p> <p>10 Q. Your testimony is that Hertford County is in</p> <p>11 the middle of the district?</p> <p>12 A. Compared to Washington or Vance, yes.</p> <p>13 Q. Okay. I just want to sort of focus on the</p> <p>14 sentence you wrote. You say, "if counties were to be</p> <p>15 split only three precincts at the eastern end of</p> <p>16 Washington County could be removed while maintaining a</p> <p>17 BVAP of 50 percent or two precincts at the western tip</p> <p>18 of Vance County could be removed."</p> <p>19 Is that statement accurate?</p> <p>20 A. I'm writing in the context of population</p> <p>21 analysis. So, yeah, I probably could have wordsmithed</p> <p>22 it better to be clearer, but in context, yes, it is</p> <p>23 right.</p> <p>24 Q. In context, and the context is?</p> <p>25 A. Analysis of the distribution of the population.</p> <p style="text-align: right;">141</p>	<p>1 towards the center. You are going to make population</p> <p>2 more compact by removing it from one of the extremes</p> <p>3 and that is Vance or Washington County here.</p> <p>4 Q. Your testimony is that it wouldn't be possible</p> <p>5 to make this distribution more compact by removing</p> <p>6 black population from Hertford County?</p> <p>7 A. No.</p> <p>8 MR. STRACH: Objection.</p> <p>9 A. I think there might be also, you know, I</p> <p>10 understand that there is a kind of fundamental</p> <p>11 disagreement in these cases between plaintiffs and</p> <p>12 defendants about whether the, whether Gingles requires</p> <p>13 a compact district and whether that is independent of</p> <p>14 the compactness of the population of the district.</p> <p>15 I understand defendants here to be arguing</p> <p>16 that what really matters is the compactness of the</p> <p>17 population of the district, which is a separate</p> <p>18 inquiry. So you would make the district less compact</p> <p>19 by removing that chunk from Bertie, I'm sure, because</p> <p>20 you would fill less of the minimum balance circle and</p> <p>21 perimeter would increase. But you also would make the</p> <p>22 population less compact, because you are removing a</p> <p>23 chunk of the population near the district centroid.</p> <p>24 The way you would make the population more compact</p> <p>25 would be by removing it from the extremes, which here</p> <p style="text-align: right;">143</p>
<p>1 Q. All right. Can you -- what would you have to</p> <p>2 add to that sentence to make it accurate?</p> <p>3 A. I think it is accurate in the broader context.</p> <p>4 I'd make it more precise by probably adding a sentence</p> <p>5 earlier explaining a little better what's going on</p> <p>6 with the population compactness. Maybe a paragraph</p> <p>7 about the work in Nairne that I'm trying to</p> <p>8 distinguish from.</p> <p>9 Q. Are you trying to say that these are the only</p> <p>10 two options if you wanted to make the county -- the</p> <p>11 district more compact?</p> <p>12 A. No.</p> <p>13 Q. So can you explain what you are saying about</p> <p>14 compactness? I'm struggling to understand the context</p> <p>15 that you say is missing?</p> <p>16 A. I'm not sure how much clearer I can be. I</p> <p>17 admit it is not wordsmithed as well it could. It</p> <p>18 could probably use a little more explication about the</p> <p>19 context, which is that this is talking about the</p> <p>20 distribution of black voters within the county.</p> <p>21 And, yes, suppose it is true you could</p> <p>22 remove black population from Halifax County even,</p> <p>23 right in the center, and maybe drop the BVAP below</p> <p>24 50 percent. But that doesn't make your black</p> <p>25 population any more compact, because you are taking it</p> <p style="text-align: right;">142</p>	<p>1 would be Vance or Washington County.</p> <p>2 Q. Okay. As written it is not true that the only</p> <p>3 way to maintain a BVAP of 50 percent in demonstration</p> <p>4 map A is to remove the three districts in Washington</p> <p>5 or the two districts in Vance, correct?</p> <p>6 A. No. I still don't agree with that, because</p> <p>7 this is in the context of discussions of the</p> <p>8 population. It could have been made more clear I</p> <p>9 admit with a little bit of better explication</p> <p>10 beforehand. And I can understand the source of</p> <p>11 confusion.</p> <p>12 Q. Okay. Because this sentence says nothing about</p> <p>13 the context of compactness, correct?</p> <p>14 A. That sentence does not say compactness, but</p> <p>15 that's the lawyerly thing of taking a sentence and</p> <p>16 ignoring the rest of the area, the rest of the section</p> <p>17 which focuses on population.</p> <p>18 Q. Okay. The word compactness doesn't appear</p> <p>19 anywhere in the paragraph containing that sentence,</p> <p>20 does it?</p> <p>21 A. No, but it's in a section dedicated to talking</p> <p>22 about population, so I stand by this sentence.</p> <p>23 Q. All right.</p> <p>24 A. If I had to do it over, I would write the</p> <p>25 paragraph a little clearer.</p> <p style="text-align: right;">144</p>

<p>1 Q. Have you looked at the transcript of</p> <p>2 Mr. Esselstyn's deposition in this case?</p> <p>3 A. No.</p> <p>4 Q. He was asked a question in which counsel</p> <p>5 suggested that some of your dot density plots or your</p> <p>6 choropleth plots have been relied on by the U.S.</p> <p>7 Supreme Court. Is it your view that the U.S. Supreme</p> <p>8 Court has relied on your dot density plots or</p> <p>9 choropleth plots in prior cases?</p> <p>10 A. I don't know.</p> <p>11 Q. Okay. Sitting here today you can't identify a</p> <p>12 case from the U.S. Supreme Court that has relied on</p> <p>13 your dot density plots or choropleth plots?</p> <p>14 A. I honestly don't know.</p> <p>15 Q. I am asking if you can identify a U.S. Supreme</p> <p>16 Court case that has relied on your plots?</p> <p>17 A. I know exactly what you are asking me. My</p> <p>18 answer is I don't know.</p> <p>19 Q. So you can't identify one?</p> <p>20 MR. STRACH: Objection.</p> <p>21 Answer it again.</p> <p>22 A. My answer is still the same answer. I don't</p> <p>23 know.</p> <p>24 Q. Do you know of any 4th Circuit case that has</p> <p>25 relied on any of the dot density plots or choropleth</p> <p style="text-align: right;">145</p>	<p>1 BVAP data loaded in?</p> <p>2 A. No. No. Open Street Map is just for the</p> <p>3 background map. I thought I should acknowledge that</p> <p>4 part.</p> <p>5 Q. Okay. Can anybody contribute to Open Street</p> <p>6 Map?</p> <p>7 A. Yeah. That's my understanding.</p> <p>8 Q. Sort of like Wikipedia for maps?</p> <p>9 A. I don't know about that, but Wikipedia does get</p> <p>10 a lot of stuff right. I don't see any suggestion that</p> <p>11 the underlying map is somehow wrong here.</p> <p>12 Q. Okay. Did you do anything to verify who</p> <p>13 contributed to, who created this map, any of the Open</p> <p>14 Street Map maps that you use?</p> <p>15 A. No. If it had like New York City in the middle</p> <p>16 of North Carolina, I wouldn't use it. But I have some</p> <p>17 familiarity with the geography of North Carolina,</p> <p>18 which reflects this map and so I certainly don't see a</p> <p>19 reason not to trust it, at least at this level.</p> <p>20 Q. Okay.</p> <p>21 A. If someone wants to suggest I-95 takes a</p> <p>22 different route or the Albemarle Sound is located</p> <p>23 elsewhere, you know, then I guess there's an error,</p> <p>24 but I don't think there is.</p> <p>25 Q. All right. The key on the right says that the</p> <p style="text-align: right;">147</p>
<p>1 plots that you use in this case?</p> <p>2 A. No. Maybe I should be more vain and keep up to</p> <p>3 date on when courts rely on my stuff, but I really</p> <p>4 don't know.</p> <p>5 Q. Has any court to your knowledge relied on your</p> <p>6 choropleth plots or dot density plots?</p> <p>7 MR. STRACH: Objection.</p> <p>8 A. I mean, it is the same thing. I really don't</p> <p>9 keep a tally of courts that rely on them or that don't</p> <p>10 rely on them. I don't know one way or the other.</p> <p>11 Q. Okay. All right. Let's go to figure 8 on page</p> <p>12 27. That's an example of one of your choropleth maps?</p> <p>13 A. Yes.</p> <p>14 Q. All right. How did you draw this map?</p> <p>15 A. In R.</p> <p>16 Q. Okay. I see the legend copyright Open Street</p> <p>17 Map contributors at the bottom of this choropleth map?</p> <p>18 A. Yes.</p> <p>19 Q. What does that reflect?</p> <p>20 A. The underlying map, the street map.</p> <p>21 Q. Okay. So you took the street map from Open</p> <p>22 Street Map and then you used R to shade the blocks</p> <p>23 based on BVAP. Is that accurate?</p> <p>24 A. Yes.</p> <p>25 Q. Okay. So Open Street Map data, does that have</p> <p style="text-align: right;">146</p>	<p>1 color yellow represents a Census block that is</p> <p>2 30 percent BVAP. Is that correct?</p> <p>3 A. That's -- remember I round up, but yes. Just</p> <p>4 like Mr. Esselstyn truncates his maps, I truncate mine</p> <p>5 at 30 percent to 70 percent.</p> <p>6 Q. Okay. So what color is a Census block that is</p> <p>7 25 percent BVAP?</p> <p>8 A. I should also before we go down this route,</p> <p>9 just put out that I'm color blind. So if we get into</p> <p>10 things that are greenish, I might give the wrong</p> <p>11 answer.</p> <p>12 But 25 percent would be shaded as what I</p> <p>13 take to be yellow.</p> <p>14 Q. Okay. So yellow represents Census block that</p> <p>15 is between zero and 30 percent?</p> <p>16 A. Yes.</p> <p>17 Q. Okay. And would a Census block that is</p> <p>18 32 percent BVAP be rounded down to 30 percent?</p> <p>19 A. It would fall within that bin. So it is not</p> <p>20 that it is rounded. Just like if -- everyone who</p> <p>21 uses choropleth maps, it's potentially one of the</p> <p>22 downsides of it, has to be bin the data. You have to</p> <p>23 decide how you're going to bin it.</p> <p>24 Q. Anything in the 30 to 35 percent range is going</p> <p>25 to show up as what color?</p> <p style="text-align: right;">148</p>

<p>1 A. Yellow.</p> <p>2 Q. So yellow color then is zero to 35 percent</p> <p>3 BVAP?</p> <p>4 A. Right. I guess you could say that it is</p> <p>5 rounded down is a way to look at it. But, yeah,</p> <p>6 that's that bin.</p> <p>7 Q. And then the next bin under it would be</p> <p>8 35 percent to 39.9 percent. Is that right?</p> <p>9 A. Yeah.</p> <p>10 Q. Then the bin under that would be 40 percent to</p> <p>11 44.99 percent?</p> <p>12 A. Yeah, I think that's right.</p> <p>13 Q. Okay. Is there anywhere where you explain this</p> <p>14 in the report?</p> <p>15 A. I thought I did, but it might not be in there.</p> <p>16 I guess that's why we do the deposition, right.</p> <p>17 Q. Okay. Can you find anywhere where you explain</p> <p>18 that in the report right now?</p> <p>19 A. No. I said I thought it was in there, but it</p> <p>20 might not be. That's why it's good to have a chance</p> <p>21 to clarify things.</p> <p>22 Q. It isn't in there, is it?</p> <p>23 A. I think I said I don't know.</p> <p>24 Q. Okay. Do you see there are areas in figure 8</p> <p>25 that are shaded white?</p> <p style="text-align: right;">149</p>	<p>1 Q. So this map, for example, allows you to</p> <p>2 distinguish between a precinct -- well, sorry, a</p> <p>3 precinct or a block that is 50 percent BVAP versus 55</p> <p>4 percent BVAP, correct?</p> <p>5 A. If I weren't color blind it probably would,</p> <p>6 yes.</p> <p>7 Q. Fair enough. But it wouldn't allow you to</p> <p>8 distinguish between a block or precinct that's</p> <p>9 75 percent BVAP versus 90 percent BVAP, correct?</p> <p>10 A. Correct.</p> <p>11 Q. Okay. You know, assuming that the population</p> <p>12 is equal, the difference between 70 percent and the</p> <p>13 95 percent is likely to have a greater impact on the</p> <p>14 overall BVAP percentage of the district. Isn't that</p> <p>15 true?</p> <p>16 A. It would have a greater impact, yeah.</p> <p>17 Q. Okay. What's the purpose of these choropleth</p> <p>18 maps in your view?</p> <p>19 A. I was asked to create them.</p> <p>20 Q. Do you draw any conclusions about demonstration</p> <p>21 district A in this report on the basis of your</p> <p>22 choropleth maps of demonstration district A?</p> <p>23 A. I was asked to create choropleth maps for</p> <p>24 demonstration district A and I created them.</p> <p>25 Q. Okay. I didn't see any conclusions in your</p> <p style="text-align: right;">151</p>
<p>1 A. Yeah. Those are empty blocks.</p> <p>2 Q. Blocks with no population?</p> <p>3 A. Yeah.</p> <p>4 Q. All right. The answers that you just gave with</p> <p>5 the coloring and key for figure 8, are those</p> <p>6 applicable to all the other choropleth maps in the</p> <p>7 report?</p> <p>8 A. Yes. They all use the same rates. They all</p> <p>9 fill in empty spots as white.</p> <p>10 Q. Okay. You say on page 27 that "these color</p> <p>11 scales on these maps are truncated at 30 percent and</p> <p>12 70 percent BVAP. In my experience allowing the color</p> <p>13 scale to run from 0 percent to 100 percent risks</p> <p>14 losing a good deal of data and differences in the</p> <p>15 crucial 40 percent to 60 percent BVAP rate are blended</p> <p>16 together."</p> <p>17 Did I read that right?</p> <p>18 A. Yes.</p> <p>19 Q. Why do you describe the 40 percent to 60</p> <p>20 percent BVAP range as crucial?</p> <p>21 A. Because that's where when -- that's where you</p> <p>22 are at the like flipping from majority BVAP precinct</p> <p>23 to minority BVAP precinct. I think that data is more</p> <p>24 interesting than the difference between a 0 percent</p> <p>25 BVAP precinct and 10 percent BVAP precinct.</p> <p style="text-align: right;">150</p>	<p>1 report about demonstration district A based on these</p> <p>2 maps. Am I wrong about that?</p> <p>3 A. I don't know that there's direct conclusions</p> <p>4 based upon these choropleths, but I was asked to</p> <p>5 create them, so I created them.</p> <p>6 Q. Okay. With respect to the approach of</p> <p>7 truncating the maps at 30 percent and 70 percent, you</p> <p>8 say on page 27, "this approach has been accepted in</p> <p>9 many courts in which I have testified and has never</p> <p>10 been challenged by a court."</p> <p>11 Do you see that?</p> <p>12 A. Yes.</p> <p>13 Q. Okay. Are you aware of any court that has</p> <p>14 considered and rejected criticism that your map</p> <p>15 truncated data at 30 percent and 70 percent?</p> <p>16 A. I don't know.</p> <p>17 Q. Okay. On page 28, I want to turn to page 28</p> <p>18 where you discuss demonstration district B.</p> <p>19 A. Okay.</p> <p>20 Q. Okay. You state that it has 77,699 black</p> <p>21 residents of voting age, correct?</p> <p>22 A. 77,599.</p> <p>23 Q. Sorry. Yes, you are right. Okay. Then --</p> <p>24 A. We all make mistakes.</p> <p>25 Q. Then you say over 11,000 of those black</p> <p style="text-align: right;">152</p>

<p>1 residents live at the top of the arm of the district 2 that extends into and splits Pasquotank County to take 3 in Elizabeth City." 4 Did I read that right? 5 A. Yes. 6 Q. All right. What area are you describing when 7 you say the top of the arm? 8 A. I don't remember if that includes Gates County 9 or not. I didn't look into this too closely, because 10 I understand Mr. Esselstyn withdrew map B. 11 Q. So I'm just asking you about your initial 12 report, you made this statement. When you made the 13 statement in your initial report, what did you mean 14 when you said top of the arm? 15 A. Well -- and I just explained it may have 16 included Gates County in there as well. I don't 17 really remember, because I haven't looked into it that 18 closely. My understanding is Mr. Esselstyn withdrew 19 district B. So it seemed like a waste of client money 20 to really dig down into stuff that's B specific. 21 Q. How did you calculate this 11,000 number in 22 your initial report? 23 A. Again, I honestly don't remember. 24 Q. Do you think top of the arm is a term that you 25 can define with reasonable scientific certainty?</p> <p style="text-align: right;">153</p>	<p>1 Q. What do you mean by "largely"? 2 A. You may have other considerations, but the 3 split, especially in the Elizabeth City area, follows 4 along the racial contours of that area, incorporating 5 all the high BVAP and excluding the whitest portions 6 of the district. 7 Q. This is based on your dot density map in figure 8 17? 9 A. No. It is the concluding section for the 10 sentence -- concluding sentence for the section, so it 11 is summarizing the analysis that precedes it. 12 Q. Are you aware that demonstration district B's 13 boundary largely tracks the boundary of Elizabeth 14 City? 15 A. Yes. 16 Q. Okay. Do you know what percentage of 17 Pasquotank County's black voting age population lives 18 in Elizabeth City? 19 A. No. 20 Q. Are you aware that most of Pasquotank County's 21 black voting age population lives in Elizabeth City? 22 MR. STRACH: Objection. 23 A. No. 24 Q. You don't know one way or the other? 25 A. I would assume that it does looking at the</p> <p style="text-align: right;">155</p>
<p>1 A. I think it, if I dug into the code enough and 2 looked at it I probably could. But as I understand 3 it, this district is no longer live, so I didn't 4 really dig into Mr. Esselstyn's rebuttal on this. 5 Q. So your representation is that your code 6 calculates this 11,000 figure? 7 A. I'd have to look into it. That's what I 8 assume. But, like I said, I haven't. And since my 9 understanding is district B-1 isn't a live district 10 right now, I doubt if I will. 11 Q. Sitting here today you can't tell me whether 12 the top of the arm refers to just Pasquotank County, 13 or Pasquotank County and all of Gates County, or 14 Pasquotank County and some portion of Gates County? 15 A. That's right. 16 Q. All right. I want to turn to page 34. 17 A. (Witness complies.) 18 Q. You say here: "This county split which barely 19 raises the BVAP of the district above 50 percent 20 appears to largely made on a racial basis." 21 Do you see that? 22 A. Yes. 23 Q. You are referring to split of Pasquotank County 24 and demonstration district B? 25 A. Yes.</p> <p style="text-align: right;">154</p>	<p>1 choropleth maps, but I don't know for sure. 2 Q. All right. So if you wanted to preserve most 3 of Elizabeth City in one district, the effect of that 4 would be to place most of Pasquotank's black residents 5 in the district that contains Elizabeth City. Is that 6 correct? 7 MR. STRACH: Objection. 8 A. Well, there is no district that contains 9 Elizabeth City since he splits, introduces a split of 10 Elizabeth City. But, yeah, I mean, whichever -- if 11 you are going to split Pasquotank County, you are 12 going to split Elizabeth City, then whichever district 13 gets most of Elizabeth City is probably going to get 14 most of the black population. 15 Q. Did you investigate whether there were other 16 alternative designs of demonstration district B that 17 would have placed a higher percentage of Pasquotank's 18 black population in the demonstration district? 19 A. No. 20 Q. Okay. Looking at your figure 17, isn't it true 21 that there are highly blue areas right outside the 22 boundaries of demonstration district B that are 23 instead left in demonstration district B-2? 24 A. Like where? 25 Q. Well, like in the middle, you don't see any</p> <p style="text-align: right;">156</p>

<p>1 blue areas that are just adjoining the black 2 boundaries surrounding Elizabeth City, but aren't in 3 demonstration district B-1? 4 A. Of course there's going to be one on this map, 5 which is showing one dot as being one person. That 6 doesn't mean that it is highly blue. Actually, most 7 of the clusters that I see to the extent they exist 8 are away from the boundary, but maybe a little bit to 9 the kind of southwest of the district. 10 But then when you look at the map where a 11 dot is 10 residents, it doesn't really show up. So 12 that's probably just over plotting. 13 Q. You don't see any -- let's turn to figure 60 14 and that's your map where the dots are 10 residents? 15 A. Yes. 16 Q. You don't see blue dots that are right near 17 boundaries of district 1, demonstration district 1 -- 18 but aren't included in demonstration district B-1? 19 A. I see blue dots. I know he's not getting the 20 entire black population of Pasquotank County in there. 21 But, no, I don't see anything equivalent 22 to some of the other clusters that he includes in 23 there. But I guess that's a judgment call. 24 Q. You don't assert in your report that any 25 demonstration district was drawn predominantly on the</p> <p style="text-align: right;">157</p>	<p>1 Do you see that? 2 A. Yes. 3 Q. All right. Mr. Esselstyn could have excluded 4 that block and raised the black population in his 5 demonstration district, couldn't he have? 6 A. I don't know if he could have with keeping 7 equal population in continuity in mind. You have to 8 make up that population elsewhere. 9 Q. You don't offer any opinion in this case that 10 race predominated over compactness in drawing 11 demonstration district B, correct? 12 A. I think I answered that that I don't offer an 13 opinion on predominance in general. I just say that 14 district lines follow -- the splits appear to be made 15 on racial basis. I don't like testifying to 16 predominance if I don't have to. 17 Q. All right. Do you agree that if it's possible 18 to draw a district with a higher minority population 19 that would do less well on criteria like compactness 20 or preserving municipalities, that would be a signal 21 that the district with the lower minority population 22 was not drawn primarily on the basis of race? 23 MR. STRACH: Objection. 24 A. Not necessarily. Just because you could be 25 more egregious doesn't mean what you have done is not</p> <p style="text-align: right;">159</p>
<p>1 basis of race, do you? 2 A. I mean, that's a legal finding, so no. I just 3 say it looks like split was made largely on racial 4 basis. 5 I really dislike testifying to the 6 ultimate question, but sometimes you have to, I guess. 7 Q. Let's go to figure 14. 8 A. (Witness complies.) 9 Q. It looks to me based on your map that there's a 10 block that's between I guess 70 percent and 11 100 percent BVAP that's just outside the border of 12 district B-1. Do you see that? 13 A. I guess this is the joys of a Zoom deposition, 14 but I assume you are -- if you look at the way that 15 Elizabeth City is split, so district 1 comes into 16 Pasquotank County kind of going through on the borders 17 of that uninhibited area. Then it kind of zigzags 18 back around Elizabeth City and there's that little arm 19 there. And then, yeah, to the, like -- that's what I 20 was referring to on the dot density map, to the south 21 and west of that arm it looks like maybe there's 22 certainly a block of high BVAP that isn't included. 23 Q. All right. In sort of the northwest portion of 24 the district you see that there are blocks included -- 25 like that green area that's less than 50 percent BVAP.</p> <p style="text-align: right;">158</p>	<p>1 egregious. 2 Q. Okay. Is it your view that if a demonstration 3 district splits a county or municipality to achieve a 4 50 percent plus 1 black population, that means that 5 race necessarily predominated in drawing the district? 6 MR. STRACH: Objection. 7 A. I'll confess post Allen v. Milligan I am even 8 less certain on legal basis about that than I was 9 before. So I'll mostly defer to the lawyers there. 10 But I can think of situations where a municipality 11 gets split, but it is not in a, you know, racially 12 significant way that wouldn't trigger any type of 13 analysis there. 14 Q. All right. Let's go to page 35 of your report. 15 A. (Witness complies.) 16 Q. Here you are discussing demonstration district 17 C, correct? 18 A. Yes. 19 Q. Okay. You say that discussing the black 20 residents of demonstration district C you say: "Over 21 10,000 of those black residents live at the top of the 22 arm of the district that extends into and splits Vance 23 County." 24 Did I read that right? 25 A. Yes.</p> <p style="text-align: right;">160</p>

<p>1 Q. Okay. How do you define top of the arm of the</p> <p>2 district that extends into and splits Vance County?</p> <p>3 A. I believe that was in Vance County.</p> <p>4 Q. Okay. So there your view is you're defining</p> <p>5 top of the arm to just include all of Vance County</p> <p>6 that's in demonstration district C?</p> <p>7 A. That's my recollection.</p> <p>8 Q. But that wasn't necessarily the way in which</p> <p>9 you defined top of the arm when you were talking about</p> <p>10 a portion of the district that split Pasquotank</p> <p>11 County?</p> <p>12 A. Yeah, it is a different shape in Pasquotank and</p> <p>13 Gates.</p> <p>14 Q. What about the shape of Gates makes it more</p> <p>15 appropriate to consider a part of the arm with</p> <p>16 Pasquotank?</p> <p>17 A. Well, because Gates includes part of the</p> <p>18 portion that branches off from the rest of the</p> <p>19 district and would form an arm.</p> <p>20 We could debate whether Gates is really</p> <p>21 the shoulder instead of the arm, but seems like a</p> <p>22 pointless debate.</p> <p>23 Q. Okay. How would you verify this claim about</p> <p>24 the 10,000 residents based on your backup data?</p> <p>25 A. I'd have to look at the relevant R code.</p> <p style="text-align: right;">161</p>	<p>1 A. Yes.</p> <p>2 Q. All right. What percentage of Vance County's</p> <p>3 white voting age population is in demonstration</p> <p>4 district C?</p> <p>5 A. I don't know.</p> <p>6 Q. So you concluded that demonstration district C</p> <p>7 separates the black population from the white</p> <p>8 population of Vance County, even though you have no</p> <p>9 idea how much of Vance County's white population is in</p> <p>10 demonstration district C. Is that right?</p> <p>11 A. Yes.</p> <p>12 Q. Okay. So I want you to imagine you have two</p> <p>13 kindergarten classes, and one had six boys and four</p> <p>14 girls and the other had four boys and six girls. Are</p> <p>15 you with me?</p> <p>16 A. Okay.</p> <p>17 Q. Would you say the school had separated the boys</p> <p>18 from the girls?</p> <p>19 MR. STRACH: Objection.</p> <p>20 A. I don't know. For something like that you</p> <p>21 could apply a T test to try to determine whether it</p> <p>22 was consistent with random placement or not. I</p> <p>23 haven't done that analysis.</p> <p>24 There's no spatial confirmation for the</p> <p>25 students when you are doing it that way, so it's a</p> <p style="text-align: right;">163</p>
<p>1 Q. On page -- let's turn to page 38.</p> <p>2 A. (Witness complies.)</p> <p>3 Q. You say, "overall the odd looking arm separates</p> <p>4 the black population of Vance County from the white</p> <p>5 population"?</p> <p>6 A. Yes.</p> <p>7 Q. Do you see that?</p> <p>8 A. Yes. I mean, that's on 38 to 39, but yeah.</p> <p>9 Q. Okay. What threshold did you apply to</p> <p>10 determine whether the district line separate the black</p> <p>11 population of Vance County from the white population?</p> <p>12 A. This gets back to where I said the Supreme</p> <p>13 Court guidance on this has been less than helpful,</p> <p>14 because it usually is an eyeball test. But I think it</p> <p>15 is pretty clear looking at that where the divisions</p> <p>16 lie. The boundary blocks are almost all heavily</p> <p>17 white, almost all heavily white on the exterior and</p> <p>18 heavily black on the interior. It is not to say every</p> <p>19 single one is, but...</p> <p>20 Q. On page 38 you conclude that 63 percent of the</p> <p>21 black voting age population of Vance County is in</p> <p>22 demonstration district C, correct?</p> <p>23 A. Yes.</p> <p>24 Q. 37 percent of the black population is left out</p> <p>25 of the district?</p> <p style="text-align: right;">162</p>	<p>1 little different than this, since you can't just</p> <p>2 randomly place Census blocks in or out of districts as</p> <p>3 kind of an alternative hypothesis. I don't think that</p> <p>4 would work.</p> <p>5 Q. So you are standing by your statement that a</p> <p>6 district that contains 63 percent of the black voting</p> <p>7 age population and leaves out 37 percent, separates</p> <p>8 the black population from the white population?</p> <p>9 A. Not always. Depends how the district boundary</p> <p>10 is drawn.</p> <p>11 Q. Okay. Would it surprise you to learn that 42</p> <p>12 percent of Vance County's white voting age population</p> <p>13 is contained in demonstration district C?</p> <p>14 A. No.</p> <p>15 Q. Okay. In your figure 21, this is your map of</p> <p>16 the way in which district C splits Vance County,</p> <p>17 correct?</p> <p>18 A. Yes.</p> <p>19 Q. All right. There are multiple blocks that are</p> <p>20 over 70 percent BVAP that are excluded from the</p> <p>21 demonstration district, even though they are in the</p> <p>22 northern part of Vance County, correct?</p> <p>23 A. Yes.</p> <p>24 Q. Okay.</p> <p>25 A. Northwest.</p> <p style="text-align: right;">164</p>

<p>1 Q. Right.</p> <p>2 Did you conduct any investigation of</p> <p>3 whether those blocks could have been included in the</p> <p>4 demonstration district without raising the population</p> <p>5 above the allowable limit?</p> <p>6 A. No.</p> <p>7 Q. Okay. Do you see the large collection of</p> <p>8 yellow blocks in this figure 21 right around where the</p> <p>9 number 1 label is?</p> <p>10 A. Yes.</p> <p>11 Q. That represents a collection of Census blocks</p> <p>12 that are majority white, correct?</p> <p>13 A. Correct.</p> <p>14 Q. That are included in demonstration district C?</p> <p>15 A. That's right.</p> <p>16 Q. Is it your opinion that the white people in</p> <p>17 those Census blocks in demonstration district C are</p> <p>18 separated from the black population in demonstration</p> <p>19 district C?</p> <p>20 A. Can you repeat that?</p> <p>21 Q. Is it your opinion that the white people in</p> <p>22 those yellow blocks in demonstration district C are</p> <p>23 separated from the black population in demonstration</p> <p>24 district C?</p> <p>25 A. No.</p> <p style="text-align: right;">165</p>	<p>1 in demonstration district C that includes part of</p> <p>2 Vance County is more odd looking than the shape of</p> <p>3 district 27?</p> <p>4 A. I haven't looked at district 27 before, so I</p> <p>5 don't really have testimony one way or another on it.</p> <p>6 Q. I'm asking for your opinion right now?</p> <p>7 MR. STRACH: Objection.</p> <p>8 If you can, answer.</p> <p>9 A. As best I can see on this, that's a really</p> <p>10 weird looking arm.</p> <p>11 Q. The one in Guilford?</p> <p>12 A. Yes.</p> <p>13 Q. All right. Is odd looking a term that has a</p> <p>14 specific meaning in political science?</p> <p>15 A. No.</p> <p>16 Q. What expertise did you apply to reach the</p> <p>17 conclusion that the arm in Vance is odd looking?</p> <p>18 MR. STRACH: Objection.</p> <p>19 A. Well, as I understand the inquiry the Supreme</p> <p>20 Court has asked people to engage in is to look for odd</p> <p>21 looking arms and appendages on districts. So I tried</p> <p>22 to follow that.</p> <p>23 Q. Did you apply any expertise as a political</p> <p>24 scientist?</p> <p>25 MR. STRACH: Objection.</p> <p style="text-align: right;">167</p>
<p>1 Q. Okay. All right. Do you understand that what</p> <p>2 you refer to as the odd looking arm in demonstration</p> <p>3 district C tracks precinct boundaries?</p> <p>4 A. Yes.</p> <p>5 Q. You understand that it incorporates 98 percent</p> <p>6 of the city of Henderson?</p> <p>7 A. Yes.</p> <p>8 Q. Okay. All right. I'm going to drop another</p> <p>9 exhibit --</p> <p>10 MR. STRACH: Can we take a quick break?</p> <p>11 MS. THEODORE: Yes.</p> <p>12 (Recess taken.)</p> <p>13 MS. THEODORE: I'm going to mark what I</p> <p>14 just sent over as Exhibit 13.</p> <p>15 (Deposition Exhibit No. 13 marked for</p> <p>16 identification.)</p> <p>17 BY MS. THEODORE:</p> <p>18 Q. Do you recognize this as a map of the 2023</p> <p>19 enacted Senate districts?</p> <p>20 A. Yes.</p> <p>21 Q. Okay. I want to direct your attention to</p> <p>22 what's labeled district 27 in Guilford County. Do you</p> <p>23 see that?</p> <p>24 A. Yes.</p> <p>25 Q. All right. Is it your testimony that the arm</p> <p style="text-align: right;">166</p>	<p>1 A. I don't think there's any political science</p> <p>2 test for odd looking arms and appendages, but it is my</p> <p>3 understanding of how the Supreme Court has instructed</p> <p>4 part of the eyeball test to be conducted, so I</p> <p>5 conducted it.</p> <p>6 Q. You are not suggesting you are better equipped</p> <p>7 to conduct that eyeball test than a layperson, are</p> <p>8 you?</p> <p>9 MR. STRACH: Objection.</p> <p>10 A. That's why I get to the point that, you know,</p> <p>11 on some of these things I was just asked to draw the</p> <p>12 map and I don't like to give ultimate testimony on</p> <p>13 whether it's reasonably configured or not. I think it</p> <p>14 looks odd looking, but that's ultimately something for</p> <p>15 the trier of fact to decide.</p> <p>16 Maybe the judge will agree; maybe he</p> <p>17 won't.</p> <p>18 Q. Okay. I want to ask you some questions about</p> <p>19 your dot density maps. I think you have six of these,</p> <p>20 figure 10, 13, 16, 17, 20 and 23. Does that sound</p> <p>21 right?</p> <p>22 A. I don't have a reason to dispute you on that.</p> <p>23 Q. Okay. Did you use R to create the dot density</p> <p>24 maps?</p> <p>25 A. Yes.</p> <p style="text-align: right;">168</p>

<p>1 Q. Okay. On page 27 of your report you say, "dot 2 density maps have been utilized in cases at least back 3 to the Bethune Hill case where Dr. Rodden employed 4 them to examine the distribution of residents of 5 districts." 6 Did I read that right? 7 A. Yes. 8 Q. Are you familiar with the dot density map that 9 Dr. Rodden used in that case? 10 A. I've seen them, but it was a while ago. 11 Q. Okay. All right. So then you say on page 27 12 that "in a dot density map Census blocks are taken as 13 the basis for the district," correct? 14 A. Yeah, that's one I might have wordsmithed a 15 little different, saying they are taken, because you 16 can took it from BTDs, you can do it from counties if 17 you want. 18 Q. Okay. Okay. In your dot density maps you use 19 one blue dot for 10 black citizens of voting age. Is 20 that right? 21 A. I think I have somewhere every dot is one 22 person, but that's generally how I approach it. 23 Q. All right. Then you use X for every one white 24 person or every 10 white people? 25 A. Yes.</p> <p style="text-align: right;">169</p>	<p>1 meter. Might be able to do with that geocoding. 2 Q. Okay. Can you turn to figure -- figure 16 on 3 page 33? 4 A. (Witness complies.) 5 Q. All right. So if I'm looking at figure 16 on 6 the computer, I see some dots that are dark blue, some 7 dots that are sort of light blue, some dots that look 8 sort of purple. Do you see what I mean? 9 A. No. I'm color blind. 10 If you are bringing red into it, like the 11 difference between blue and purple, no. I just see 12 blue. But I'm color blind, so that's an important 13 caveat. 14 Q. Right, okay. So can you explain why some dots 15 in your maps would be different shades of blue? 16 A. No, because they all look blue to me. They are 17 all coded as blue. Blue is the only color. 18 It may be that for people with typical 19 color vision the orange, the red from the orange 20 interacts with the blue to make it look slightly 21 different shade. But I'm sorry, I can't answer that 22 really. 23 Q. Okay. Any reason in the code why a dot would 24 appear as purple instead of blue? 25 MR. STRACH: Objection.</p> <p style="text-align: right;">171</p>
<p>1 Q. How do you decide where within the Census block 2 the dot or X is placed? 3 A. It's randomly placed by R. 4 Q. Okay. Did you change the placement of any dot 5 or X in any of your dot density maps in the report? 6 A. I don't think so. 7 Q. Okay. So the fact that a dot or X is next to a 8 district line doesn't necessarily mean that the people 9 in that Census block live near the district line. Is 10 that right? 11 A. Well, that's part of why I use blocks as my 12 foundation here is that blocks are generally, not 13 always, but generally pretty small geographic units. 14 And so if a person in a block is near the district 15 line, it's probably going to be near the district 16 line. 17 Q. Well, a block in certain areas could span like 18 hundreds of square miles, couldn't it? 19 A. Some blocks are bigger than others, but 20 generally speaking you can look at the choropleth maps 21 and see we are talking about some pretty small units 22 geographically. 23 But, yeah, we don't know, from the Census 24 we don't know the geocodings of the locations of the 25 people, so we can't put it, you know, within a square</p> <p style="text-align: right;">170</p>	<p>1 A. No. The command is to make them blue. 2 Q. Okay. On page -- 3 A. So they would be blue, but the eye might 4 perceive it differently, I guess. I don't know. They 5 all look blue to me. 6 Q. Okay. On page 33 you say, "we can create a 7 similar dot plot where one dot represents one person 8 though over plotting begins to become an issue 9 depicted below." 10 Did I read that correctly? 11 A. Yeah. 12 Q. All right. You're referring to the figure 17 13 on page 34? 14 A. Yes. 15 Q. What do you mean by over plotting begins to 16 become an issue? 17 A. You start to get, you know, for a block of 18 1,000 people or even 100 people, that maybe takes up, 19 you know, 5 by 5 millimeter area on the page, that's 20 an awful lot of dots to print in one area, so you kind 21 of get a blob, which is what I think you start to the 22 really see on this page. 23 Q. Okay. So it is not really possible to tell 24 from the blobs of orange like how many white people 25 are actually in the relevant region?</p> <p style="text-align: right;">172</p>

<p>1 A. It is very difficult to count some of these 2 blocks. These start to effectively become choropleth 3 maps, because you are just kind of filling in -- 4 they're like yes no choropleth maps, because you are 5 filling in regions.</p> <p>6 So, I mean, people always complain no 7 matter what I do with the dot plots. So I was trying 8 to give a couple different looks on it and explain why 9 I like the one dot equals 10 people, but...</p> <p>10 Q. Okay. In the area of Elizabeth City in this 11 figure 17, are the blue dots that are sort of in the 12 blue blob there obscuring orange Xs for white people?</p> <p>13 A. Yeah. That's part of the over plotting issue.</p> <p>14 Q. Okay. So in that area of sort of the blue 15 blobs there are white people, they are just sort of 16 under the blue blob in the map. Is that right?</p> <p>17 A. Yeah. Like I said, this isn't my favorite 18 look. Over plotting starts to become an issue. But 19 sometimes people complain, so here's what it looks 20 like with one person.</p> <p>21 Q. Okay. On page 27 -- let's flip back there -- 22 you state that your dot density plots are using black 23 CVAP and white CVAP. You see that?</p> <p>24 A. Yeah. I think that's wrong, because I don't 25 know if that's right or not.</p> <p style="text-align: right;">173</p>	<p>1 A. Right. It is residents of voting age, not 2 citizens of voting age.</p> <p>3 Just to clarify, because you did give an 4 instruction, I will not look at anything that you 5 haven't given to me, but if something has been marked 6 and it's an exhibit in this deposition, I consider it 7 fair game. I will look at it if it is helpful.</p> <p>8 Q. Okay. Is that, the sentence that says, "I 9 employ one blue dot for 10 black citizens of voting 10 age and an orange X for 10 white citizens of voting 11 age," on page 27, did you just copy that language from 12 another report in which you use CVAP for the dot 13 density plots?</p> <p>14 A. I don't think so. I think I was just in a 15 groove of talking about citizens of voting age and 16 made the mistake.</p> <p>17 Q. Okay. Have you done dot density plots on the 18 basis of CVAP rather than VAP before?</p> <p>19 A. I don't think so, because that gets really, 20 that raises a lot of the issues that we have talked 21 about elsewhere in this deposition about not really 22 knowing what the CVAP would be down to the block level 23 to enable this.</p> <p>24 Even at the block group level because the 25 error margins are so substantial there, I think it</p> <p style="text-align: right;">175</p>
<p>1 Q. Okay. I mean, just turning to page 28 where 2 you have figure 10, do you see you say one blue dot 3 equals 10 black residents of voting age?</p> <p>4 A. Yes. I see that. It is definitely the BVAP.</p> <p>5 I shouldn't say that. I'm pretty sure 6 it's the BVAP.</p> <p>7 Q. Sitting here today you can't, you don't know 8 whether you used BVAP or CVAP for these dot density 9 plots?</p> <p>10 A. It is VAP.</p> <p>11 Q. I'm sorry?</p> <p>12 A. It's voting age population.</p> <p>13 Yes, voting age population. I'm looking 14 at the code.</p> <p>15 Q. Okay. Just please don't look at anything 16 without, unless I've given it to you to look at.</p> <p>17 A. You have given this to me. This is an exhibit.</p> <p>18 MR. STRACH: He has the exhibits on the 19 computer. That's all he's looking at.</p> <p>20 A. Remember we looked at my code earlier in the 21 deposition.</p> <p>22 Q. I do remember that. Okay.</p> <p>23 All right. So it is voting age population 24 and this statement on page 27 is incorrect?</p> <p>25 MR. STRACH: Objection.</p> <p style="text-align: right;">174</p>	<p>1 would be tricky to do a dot density plot. I'm not 2 going to say I've never done it before, I might have 3 done it and not really thought about the error margin 4 issue, but I honestly can't think of an instance where 5 I've done it.</p> <p>6 Q. Okay. So is the goal of the dot density plots 7 to show whether the demonstration district order 8 tracks areas where black people are a majority of the 9 population?</p> <p>10 A. I think the choropleth maps are better -- 11 first, I don't know how the lawyers plan to argue 12 this. A lot of this isn't a goal. It is I was asked 13 to create maps and I did.</p> <p>14 My general view is that the choropleth 15 maps are better for tracking how the boundaries are 16 drawn and that the dot density maps are better for 17 showing distribution of the population.</p> <p>18 Q. Okay. BVAP is calculated by comparing the 19 number of black residents of voting age to the number 20 of all residents of voting age, correct?</p> <p>21 A. Yes.</p> <p>22 Q. Not just white residents of voting age?</p> <p>23 A. Correct.</p> <p>24 Q. Okay. If you take a district and you add a 25 precinct where black voters are less than half of the</p> <p style="text-align: right;">176</p>

<p>1 voting age population, that's going to bring down BVAP</p> <p>2 percentage in your district, correct?</p> <p>3 A. Depends on if your district is majority BVAP,</p> <p>4 then yes.</p> <p>5 If your district is 20 percent BVAP, then</p> <p>6 it wouldn't necessarily do that.</p> <p>7 Q. Fair enough.</p> <p>8 All right. If you take a majority BVAP</p> <p>9 district and add a precinct where black voters are</p> <p>10 less than half the voting age population, that will</p> <p>11 bring down the BVAP of that district, correct?</p> <p>12 A. Yes.</p> <p>13 Q. That would be true even if the precinct had</p> <p>14 more black voters than white voters?</p> <p>15 A. You mean actual voters? Yeah.</p> <p>16 Q. More black residents of voting age population</p> <p>17 than white residents of voting age population?</p> <p>18 A. Right.</p> <p>19 Q. All right. So your dot density plots only plot</p> <p>20 black people and white people, correct?</p> <p>21 A. That's right.</p> <p>22 Q. By excluding people who are of other races,</p> <p>23 your dot density plots give a misleading impression of</p> <p>24 how the district lines divide precincts that are</p> <p>25 majority black, don't they?</p> <p style="text-align: right;">177</p>	<p>1 I don't think adding in Native American or</p> <p>2 Hispanic population here is going to make the black</p> <p>3 population look any more or less compact, but I guess</p> <p>4 that's a judgment call.</p> <p>5 Q. All right. I think I transmitted this exhibit</p> <p>6 already potentially, I think it is going to be --</p> <p>7 MR. STRACH: Is that Exhibit 5 that we</p> <p>8 didn't use?</p> <p>9 MS. THEODORE: It's going to be marked as</p> <p>10 Exhibit 5 that we didn't use.</p> <p>11 (Deposition Exhibit No. 5 marked for</p> <p>12 identification.)</p> <p>13 THE WITNESS: Which one is this?</p> <p>14 MR. STRACH: Go back to the list on Zoom.</p> <p>15 BY MS. THEODORE:</p> <p>16 Q. It says, 251 Soto Palmer Trende initial report,</p> <p>17 you see that?</p> <p>18 A. Yes.</p> <p>19 Q. Okay. Do you recognize this as a report that</p> <p>20 you filed in the Soto Palmer case we were talking</p> <p>21 about earlier?</p> <p>22 A. Yes.</p> <p>23 Q. Okay. If you go to page 32?</p> <p>24 A. Yes.</p> <p>25 Q. All right. Does that refresh your recollection</p> <p style="text-align: right;">179</p>
<p>1 MR. STRACH: Objection.</p> <p>2 A. No. Like I said, in my mind the use of, the</p> <p>3 utility of the dot density plot is to show</p> <p>4 distribution of the black population. It is better</p> <p>5 for answering the question of is the minority group</p> <p>6 compact for purposes of Gingles 1, which I understand</p> <p>7 plaintiffs don't generally concede the minority group</p> <p>8 itself has to be compact, but I think the choropleth</p> <p>9 maps are better for showing actual racialized line</p> <p>10 drawing.</p> <p>11 Q. Okay.</p> <p>12 A. Really, the orange Xs, white population is just</p> <p>13 to give a general sense of the overall distribution of</p> <p>14 the population, because if you just show the black</p> <p>15 population on the map, you know, it doesn't tell you,</p> <p>16 well, maybe there's like a bayou in the middle. But</p> <p>17 in the white population as well gives a better</p> <p>18 understanding of that.</p> <p>19 I wouldn't have any objection to anyone</p> <p>20 coming in and showing the dot plots with Hispanic and</p> <p>21 Native American added as well.</p> <p>22 Q. You have done that in other cases, haven't you?</p> <p>23 A. Well, I've done it for Hispanic population,</p> <p>24 yeah. I don't know if I've done three color dot plots</p> <p>25 or not.</p> <p style="text-align: right;">178</p>	<p>1 that you have done dot density maps that include both</p> <p>2 the minority population of interest, the white</p> <p>3 population, and then other populations in three</p> <p>4 different colors?</p> <p>5 A. So -- yes. But in that -- yeah. Okay, yeah.</p> <p>6 In that case the Native American population was of</p> <p>7 interest as well, which was pretty much what the other</p> <p>8 dots would be.</p> <p>9 But, yes, I have done three way plots</p> <p>10 before.</p> <p>11 Q. Was there a reason you chose not to do a three</p> <p>12 way plot in this case?</p> <p>13 A. I think when you don't have large empty swaths</p> <p>14 that show a concentration at least theoretically of</p> <p>15 the Native American population, it doesn't add a whole</p> <p>16 lot, especially since here we really are just</p> <p>17 concerned with the compactness of the black</p> <p>18 population. But I don't think it is wrong to show the</p> <p>19 other populations on as well. I don't think it</p> <p>20 changes the analysis any.</p> <p>21 Q. Okay. So I want to understand how the rounding</p> <p>22 works in the dot density plots that use Xs and dots to</p> <p>23 represent 10 people. Is it true that one orange X</p> <p>24 could represent anywhere from 5 to 14 white people in</p> <p>25 a Census block?</p> <p style="text-align: right;">180</p>

<p>1 A. That's not quite right. That's not quite 2 right. 3 Q. Let me put it differently. If there were 4 between 5 and 14 white people in a Census block, your 5 plot would show one orange X in that Census block. Is 6 that true? 7 A. That's right. 8 Q. If you have two orange Xs in a Census block, 9 you could have anywhere from 15 to 24 white people in 10 that Census block. Is that true? 11 A. Right. One of those dots would be 10 people 12 and the other is rounded. 13 This is precisely why I include the dot 14 plot that has one -- this is precisely the objection 15 that is why I include the dot plot that has one dot 16 being one person. I mean, you kind of pick your 17 poison, you either include some rounding or you 18 basically transform your map into a choropleth. 19 Q. Okay. But I just want to focus on sort of the 20 numbers here for a minute. One blue dot in a Census 21 block would represent -- let me start again. 22 If there's one blue blot in a Census 23 block, that means there are anywhere from 5 to 14 24 black people in that Census block. Is that correct? 25 A. That's correct.</p> <p style="text-align: right;">181</p>	<p>1 A. If it were just one block in the map, that 2 would be a pretty substantial -- that could be a 3 pretty substantial problem. Spread out over the 4 course of hundreds of blocks, that's going to be less 5 of a problem, because you are going to get examples on 6 each extreme. 7 Q. You would agree that 15 is nowhere near twice 8 as many as 14, right? 9 A. I'll agree to that. 10 Q. Okay. Don't you think it is inaccurate to 11 portray the white population in a geographic area as 12 twice the size of the black population if, in fact, 13 there may be nearly the same number of white and black 14 people in that area? 15 MR. STRACH: Objection. 16 A. Well, none of these plots are perfectly 17 aggregated. The whole point of data visualization is 18 usually -- part of the trick I should say of data 19 visualization is usually you lose some information. 20 So what the maps on pages 33 and 34 show is that you 21 kind of have choice, you can retain all the 22 information about individual level data and you end up 23 with over plotting as an issue, or you can choose to 24 have some rounding error that probably cancels out in 25 the aggregate.</p> <p style="text-align: right;">183</p>
<p>1 Q. Okay. 2 A. For the maps with 10, not for the maps that 3 have one dot equals one person. 4 Q. Right. 5 I think five of the six dot plots in your 6 report have the one dot equals 10 people. Is that 7 right? 8 A. Yeah. From my point of view, it is better to 9 have the random error from rounding, which is this 10 scale probably cancels out in the aggregate, versus 11 the massive over plotting, and I think that's what 12 figure 17 suggests. 13 But if someone thinks that's misleading 14 and you have a better view using one dot meaning 15 1 person, I mean, these plots are pretty easily 16 customizable and they could be produced. 17 Q. Okay. So in a Census block with two orange Xs 18 and one blue dot, your plot is visually depicting 19 twice as many white people as black people, right? 20 A. Yes. 21 Q. In reality that Census block with two orange Xs 22 and one blue dot could have 15 white people and 14 23 black people, correct? 24 A. It is possible, yeah. 25 Q. Okay.</p> <p style="text-align: right;">182</p>	<p>1 So, yeah. It is kind of pick your poison, 2 but these dot plots are accepted and you kind of have 3 a choice between one or other. If someone has a 4 better way to do it, I'm open to it. 5 Q. Okay. There was a lot there, so I just want to 6 ask you a few questions. So just to focus again on 7 figure 17, which I think is the plot you were 8 referring to that has one X per person? 9 A. Um-hm. 10 Q. That plot doesn't, in fact, retain all of the 11 data, because the blue blob is covering up a lot of 12 orange Xs. Isn't that true? 13 A. Yeah. That's what I said in the introduction, 14 a lot of data analysis is choosing what information 15 you retain and what you're going to lose. These two 16 plots are a great example in my mind of the trade offs 17 involved. 18 Q. Okay. When you say dot plots are accepted, 19 what are you referring to? 20 A. Like I said, dot plots have been used in 21 redistricting cases going back at least to 22 Dr. Rodden's dot plots in Bethune Hill, maybe 23 longer -- I shouldn't say dot plots. I should say dot 24 density maps, which is the more precise term. 25 Q. Okay. Any other examples of cases where dot</p> <p style="text-align: right;">184</p>

<p>1 density plots were accepted in redistricting cases 2 that come to mind? 3 A. I think Michael v. McDonald used them in one of 4 the Virginia cases, maybe not Bethune Hill, but I'm 5 blanking on the name of the legislative case. 6 Q. Okay. So putting aside the question of whether 7 there are better options, I just want to ask the 8 question: Do you think it is inaccurate to portray 9 the white population in a geographic area as twice the 10 size of the black population when, in fact, there may 11 be nearly the same number of white and black people in 12 that area? 13 A. It is inaccurate at the block level. It is not 14 necessarily going to be inaccurate at the map level, 15 which is the area that we are interested in. 16 Q. All right. What did you do to determine it 17 wasn't inaccurate at the map level? 18 A. Well, we talked about that normal distribution 19 earlier. And there's something called law of large 20 numbers that isn't specific to normal distribution, 21 but as you take more and more -- it lies kind of at 22 the heart of frequentism, as you take more and more 23 samples, your distance from the mean decreases greater 24 and greater. 25 So sometimes, yes, you will have a plot</p> <p style="text-align: right;">185</p>	<p>1 A. Yes. 2 Q. Okay. Isn't that also true of the populations 3 that you are using to create these dot density plots? 4 A. Apples and oranges. 5 Q. You don't agree that populations of black 6 people and white people for purposes of your dot 7 density plots may be geographically clustered together 8 in non random fashion? 9 A. They may be clustered, but the errors wouldn't 10 be, because you could have -- if there are, say, 10 11 black individuals and 15 or 20, yeah, whether there 12 are 9 black individuals or 10 black individuals or 11 13 or 16, that type of distribution is not going to be 14 randomly distributed. 15 Where it starts to become a problem where 16 you can't use the weak law of large numbers is when 17 you have spatial heterogeneity in how you split the 18 district. So when you are splitting these block 19 groups, you don't know whether it is just as likely 20 for the black population to be outside of the district 21 as it is inside of the district. In fact, given that 22 minority populations are clustered there probably is a 23 pattern to how they are distributed within the 24 district. 25 That's different than literal rounding</p> <p style="text-align: right;">187</p>
<p>1 that distributes, that shows 14 black residents and -- 2 there's 14 black residents and 15 white residents. It 3 shows two Xs and one dot. But sometimes you will have 4 the proportions winding up at the other end of those 5 extremes as well. So in the aggregate it will tend to 6 cancel out and give you an accurate depiction. 7 Q. Is there any reason to think that the Census 8 blocks where you have the error in the opposite 9 direction are going to be near the Census blocks where 10 you have the error in the original direction? 11 A. It is going to be randomly distributed. So 12 sometimes yes, sometimes no. 13 Q. On page -- let's turn to page 27 of your 14 report -- I'm sorry. Let's turn to page 17 of your 15 report, footnote 7. 16 A. (Witness complies.) 17 Q. Here you are talking about distribution of 18 error in CVAP estimates, correct? 19 A. Right. 20 Q. All right. You say here that you have good 21 reason to believe that errors in CVAP estimates are 22 not randomly distributed since populations are often 23 geographically clustered together in non random 24 fashion. 25 Do you see that?</p> <p style="text-align: right;">186</p>	<p>1 area, which is what we are talking about with the dot 2 density plots. It is completely different. 3 Q. Are you aware of any academic work that has 4 validated your statement that the errors here are 5 going to be randomly distributed across the district? 6 A. It is literal rounding error. Yes, there will 7 be. 8 Q. What can you point me to that would support 9 that conclusion? 10 A. That there is a round command in R that rounds 11 the data up or down. That rounding error is 12 completely different than the error you get by 13 splitting a block group where there's a good chance 14 the minority population and the white population 15 within that block group are clustered together. 16 Again, if someone thinks this is an issue, 17 they are more than welcome to produce a dot density 18 plot that they think shows things better for you. 19 I've seen an attempt at that and I think it makes 20 things worse for you, but, like I said, a lot of this 21 involves judgment calls. That's the nature of data 22 visualization. 23 Q. I want to understand, you have done no work in 24 this case to validate the assumption that the rounding 25 that you engaged in doesn't matter?</p> <p style="text-align: right;">188</p>

<p>1 MR. STRACH: Objection.</p> <p>2 A. I'm sorry you don't understand, but I think</p> <p>3 I've been about as clear as I can be on that. That it</p> <p>4 is literal binomial rounding error, sometimes it's</p> <p>5 going to be higher, sometimes it's going to be lower.</p> <p>6 In the aggregate that type of error will cancel out,</p> <p>7 as opposed to some error from splitting a block group</p> <p>8 where we have good reason to believe that the</p> <p>9 residents are spatially constrained, where you have</p> <p>10 relatively small number of block groups, and where we</p> <p>11 don't even have any type of known distribution to</p> <p>12 compare the error rate to. So...</p> <p>13 Q. How many block groups will it take for the</p> <p>14 rounding errors to cancel out?</p> <p>15 A. Well, that's just it, it is not a rounding</p> <p>16 error for the block groups when it comes to splitting</p> <p>17 CVAP. You are splitting block groups in a</p> <p>18 particularized way and since the populations tend to</p> <p>19 be randomized, but generally speaking like when you</p> <p>20 start to get about 30 observations that's when you</p> <p>21 start to be able to talk about this type of</p> <p>22 cancellation working.</p> <p>23 But even then, because we can't know true</p> <p>24 value when we are talking about the block groups being</p> <p>25 disaggregated, we have nothing ever to test against,</p> <p style="text-align: right;">189</p>	<p>1 dot plots, are you suggesting that you need 30 blocks</p> <p>2 for the rounding errors to cancel out?</p> <p>3 A. It's a rule of thumb, but, yeah, that's when I</p> <p>4 would start to expect it to work.</p> <p>5 Q. Okay. So what that means is that if you have</p> <p>6 one block that has two orange Xs for 15 white people</p> <p>7 and one blue dot for 14 white people, then maybe</p> <p>8 another block that's 30 blocks away might have the</p> <p>9 opposite error?</p> <p>10 MR. STRACH: Objection.</p> <p>11 A. Or the block that's right next door might have</p> <p>12 the opposite error.</p> <p>13 Q. You just don't know?</p> <p>14 A. Well, no. That's the point of randomness. But</p> <p>15 when you have hundreds of blocks, you are well past</p> <p>16 the threshold of 30, and so in the aggregate those</p> <p>17 errors are going to cancel out.</p> <p>18 Like I said, if there's a suggestion that</p> <p>19 somehow these maps are deceiving the eye, it would be</p> <p>20 very easy to demonstrate that by just replicating the</p> <p>21 map. And if this rounding error is causing huge</p> <p>22 problems, then replicating the map should give you a</p> <p>23 radically different view. But I know Dr. Collingwood</p> <p>24 produces his maps and I don't think they are radically</p> <p>25 different.</p> <p style="text-align: right;">191</p>
<p>1 we have no idea how those errors are distributed.</p> <p>2 Q. Okay. But, again, you didn't test how the</p> <p>3 errors were distributed in your racial dot plot?</p> <p>4 A. No. I have no reason to believe that there's</p> <p>5 any type of pattern to how the errors exist. If one</p> <p>6 of your experts had come in and down that analysis, it</p> <p>7 might have changed my presumption, but since you just</p> <p>8 have literal rounding errors that are going to be a</p> <p>9 binomial yes no high low, in the aggregate they will</p> <p>10 tend to cancel out.</p> <p>11 Or your experts could have run a bunch of</p> <p>12 dot plots and shown how from view to view because of</p> <p>13 that rounding error, the looks from the dot plots are</p> <p>14 radically different. But I'm fairly confident if they</p> <p>15 tried that they wouldn't be able to show the outputs</p> <p>16 are radically different, because these errors are</p> <p>17 going to cancel out.</p> <p>18 Q. When you say that the errors are going to</p> <p>19 cancel out in your dot plots, what you mean is that if</p> <p>20 you have -- well, let me ask you this: Your reference</p> <p>21 to 30 blocks, was that referring to your assessment of</p> <p>22 when the errors cancel out in your dot plots?</p> <p>23 A. That's just a general rule of thumb of when</p> <p>24 these type of convergence metrics become useful.</p> <p>25 Q. So with respect to your dot plots, your racial</p> <p style="text-align: right;">190</p>	<p>1 Q. When you say replicating the map, do you mean</p> <p>2 with a different rounding or what do you mean?</p> <p>3 A. No. No. Just run the code. You will get a</p> <p>4 different set of roundings. It is what we were</p> <p>5 talking about earlier that like with the normal --</p> <p>6 kind of like draws on that normal distribution idea,</p> <p>7 if you take repeated samples, you start to get a look</p> <p>8 of the true distribution. And so if this rounding is</p> <p>9 causing you to believe that there are, say, twice as</p> <p>10 many black people relative to white people in</p> <p>11 Elizabeth City, that should really quickly become</p> <p>12 apparent if you generate multiple maps.</p> <p>13 Q. I may not be following. I thought that these</p> <p>14 dots plots are using BVAP data at the Census block</p> <p>15 level from the decennial Census. Isn't that true?</p> <p>16 A. Yes.</p> <p>17 Q. So your code, when your code is rounding, your</p> <p>18 code is taking data from the Census that says this</p> <p>19 block has --</p> <p>20 A. I see what you're saying. I'm misstating. It</p> <p>21 will place it slightly different within the block.</p> <p>22 But the rounding will be same.</p> <p>23 You can compare it to maps that I produced</p> <p>24 that have a dot, you know, one dot per person. I</p> <p>25 don't think they give a radically different view of</p> <p style="text-align: right;">192</p>

1 what the distribution of black people within the
2 district are.

3 Like I said, all these dot density maps no
4 matter what have this shortcoming, that you either
5 have to do some rounding or you end up with a blob.

6 I don't think it gives -- I simply
7 disagree with you that it gives any type of misleading
8 view as to the overall distribution of black people in
9 this map vis-a-vis white people. I don't see how you
10 can think that.

11 Q. All right. Dr. Trende, I just want to make
12 sure the testimony is clear on sort of the way in
13 which this works. So the rounding is, your rounding
14 is, you take the actual number from the decennial
15 Census for that Census block, right, and then you
16 round it down or up, right?

17 A. Right.

18 Q. That rounding is not going to change if you
19 were to replicate what you have done here, is it?

20 A. Right. The placement of the dots within the
21 blocks will shift, though.

22 Q. Okay. But that has nothing to do with
23 rounding?

24 A. Rounding will be the same from map to map.

25 Q. Right. So what you said about replicating what

193

1 you did and seeing if it changes would not, you
2 couldn't actually replicate what you did using
3 different rounding and get a different map, correct?

4 MR. STRACH: Objection.

5 A. Well, yes. So I was visualizing it in terms of
6 the placement of the dots and not the rounding. But I
7 do think you could -- however you wish to do it, use
8 different rounding rules to see if it gives you a
9 radically different view of the distribution of black
10 residents of the district versus white residents of
11 the district.

12 And at the end of the day it is a trade
13 off involved with dot density maps. But sometimes you
14 will have a block that rounds things up; sometimes you
15 will have a block that rounds things down. In the
16 aggregate I don't have any reason to believe that it
17 wouldn't be presenting a generally acceptable view.

18 Q. Right, but you have no basis for saying that in
19 any particular group of Census blocks that it is
20 presenting an accurate view of the number of white
21 people and black people, any particular group of 15
22 Census blocks, for example?

23 MR. STRACH: Objection.

24 A. I think within 15 you are getting pretty good.
25 But, again, these maps all have hundreds of Census

194

1 blocks within them, so in the aggregate I think it's
2 probably pretty good. You can see that by comparing
3 it to the single dot plot map, I don't see things
4 radically different, but I guess that's a judgment
5 call about which reasonable minds can disagree.

6 Q. When you say that these block plots have
7 hundreds of Census blocks, the point of the plot is to
8 show where the black and white people are located,
9 right?

10 A. Right.

11 Q. So if an error is corrected, if you have an
12 error in the opposite direction in one Census block
13 that's 100 miles away from another Census block, that
14 doesn't make the map more accurate, does it?

15 A. If you have one more dot in a single Census
16 block that is surrounded by, say, five blocks that get
17 the rounding right and then -- or I shouldn't say get
18 it right. That have what you would depict even if you
19 weren't rounding. And then have another block
20 adjacent to that that gets the rounding error in the
21 other direction, no, I don't think you are going to
22 get a radically -- I don't even think you are going to
23 get a minorly misleading view of what's depicted. We
24 just disagree on this.

25 Q. Okay. Is it your understanding that Dr. Robin

195

1 uses a version of dot density plots that require
2 rounding?

3 A. He would have to, because he's using one dot
4 for 100 people in the Williamson case.

5 Q. What about in the Bethune Hill case?

6 A. I guess that's been a long time since I've
7 looked at that.

8 Q. How much larger are the Xs that you use for
9 white people than the dots that you use for black
10 people?

11 A. I don't know. They both are sized one in R.

12 Q. But Xs are larger in R than dots?

13 A. Yes.

14 Q. Okay. You could have chosen to make the
15 symbols the same size, right?

16 A. Could have shrunk the Xs more, yeah.

17 Q. Wouldn't that have been more accurate?

18 MR. STRACH: Objection.

19 A. No.

20 Q. Why not?

21 A. Because I don't think it is inaccurate to have
22 them larger. Like I said, I think it makes the black
23 population look more dispersed to use the look that
24 Dr. Collingwood and Mr. Esselstyn are suggesting.

25 Q. Let's flip to -- well, all right. Before we do

196

<p>1 that, you could have used dots for both black people 2 and white people, right?</p> <p>3 A. Yeah. But being color blind I'm kind of 4 sensitive to dots are difficult to read, so I like 5 having a different shape.</p> <p>6 Also, some printers aren't going to show 7 things well, show shades well. So shapes are nice in 8 that sense.</p> <p>9 Q. Could you have used a gray background and used 10 white dots for white people and black dots for black 11 people, right?</p> <p>12 A. Maybe.</p> <p>13 Q. Okay.</p> <p>14 A. How would you do that in the three way map that 15 you all are suggesting, though?</p> <p>16 Q. Well, Dr. Trende, you didn't use a three way 17 map, did you?</p> <p>18 A. Well, no. I know, but if you are insisting 19 that a three way map is how it is supposed to be done, 20 then a gray background with white dots and black dots 21 doesn't leave an option I don't think for the third.</p> <p>22 So it's kind of my general take on all 23 these criticisms, there's no perfect data depicting. 24 They all have shortcoming and it is a question of 25 which shortcoming you are happiest with.</p> <p style="text-align: right;">197</p>	<p>1 don't know, but they are identical. I figure if I set 2 them identically, people would not be able to 3 complain. I was apparently wrong, but I'm more than 4 happy to see how these things look with different 5 sizes, dots and Xs.</p> <p>6 I don't think it looks better for 7 plaintiffs if you make the Xs smaller, but I could be 8 wrong.</p> <p>9 Q. Okay. Are you aware of any peer reviewed text 10 that supports the way that you have designed the dot 11 plots in this case?</p> <p>12 A. No. I'm not aware of peer reviewed texts on 13 how to use dot density maps in these cases in general 14 or discussing the pros and cons. None of us seem to 15 have cited it to each other.</p> <p>16 I just know how they have typically been 17 used in cases before where courts have relied on them. 18 But no matter what you do, if you are doing dot 19 density map, you either -- well, yeah. I was changing 20 the subject there and I shouldn't.</p> <p>21 Q. Okay. But just to be clear, you are not aware 22 of any court that has relied on a dot density plot 23 that uses Xs for white people and dots for black 24 people, are you?</p> <p>25 A. No. I haven't done any legal research on that,</p> <p style="text-align: right;">199</p>
<p>1 What I like here is that the size is 2 always one, so no one can come and yell that you use 3 size .5 here and size one here.</p> <p>4 If someone thinks a better depiction gives 5 a different answer, you can always produce your 6 preferred look at the dot plots.</p> <p>7 But there is to my knowledge no peer 8 reviewed text that says when you are doing dot plots 9 you should size your Xs at 0.1 and your dots at 1.</p> <p>10 Q. To your knowledge, is there any peer reviewed 11 text that says when you are doing dot plots you should 12 use Xs that are a different size for one race and dots 13 for another race?</p> <p>14 A. They aren't a different size. They are both 15 size equals one.</p> <p>16 Q. Dr. Trende, your testimony is that the Xs in 17 your plots are not a different size than the dots?</p> <p>18 A. We can put up the R code. They are both size 19 equal one.</p> <p>20 Q. I'm not asking about the R code. I'm asking 21 about a human being looking at these Xs and dots. 22 Your testimony is that they are the same size?</p> <p>23 MR. STRACH: Objection.</p> <p>24 A. My testimony is that I set the size in R and 25 however R determine s size, whether it is by area, I</p> <p style="text-align: right;">198</p>	<p>1 but I think the reason for using an X and a dot I've 2 explained pretty well.</p> <p>3 Q. Okay. What's the alpha parameter on the dot 4 density plot?</p> <p>5 A. It is transparency.</p> <p>6 Q. All right. You set the Xs representing white 7 people to be fully opaque with an alpha value of one. 8 Is that right?</p> <p>9 A. Right.</p> <p>10 Q. You set the dots representing black people to 11 be more transparent with an alpha value of .5. Is 12 that right?</p> <p>13 A. That's right. That's because of the over 14 plotting issue.</p> <p>15 Q. Okay. Why did you choose to make white people 16 fully opaque and black people transparent?</p> <p>17 MR. STRACH: Objection.</p> <p>18 A. Because of the over plotting issue.</p> <p>19 Q. Why did you choose to make white people opaque 20 as opposed to black people opaque?</p> <p>21 MR. STRACH: Objection.</p> <p>22 A. Because of the over plotting issue. I don't -- 23 I don't understand what's confusing. I'm sorry.</p> <p>24 Q. You could have done the dot plot giving the 25 alpha value of one to the blue dots, couldn't you?</p> <p style="text-align: right;">200</p>

<p>1 MR. STRACH: Objection.</p> <p>2 A. But then it wouldn't address the over plotting</p> <p>3 issue since the blue dots are on the top.</p> <p>4 Q. Why did you put blue dots on top?</p> <p>5 MR. STRACH: Objection.</p> <p>6 A. Because one of them has to be drawn first, one</p> <p>7 has to be drawn second.</p> <p>8 If I had drawn the white population on</p> <p>9 top, I would have set the alpha for that to be .5 and</p> <p>10 alpha for the black population to be one to address</p> <p>11 the over plotting issue.</p> <p>12 Q. So you drew the white people first and then the</p> <p>13 black people. Is that right?</p> <p>14 A. Yes.</p> <p>15 Q. Okay. What's the stroke value in these dot</p> <p>16 density plots?</p> <p>17 A. It is the border, it is like -- so if you are</p> <p>18 drawing an X, if you can imagine like having a pen, it</p> <p>19 is how thick the pen is.</p> <p>20 Q. Did you set the stroke value differently for</p> <p>21 the Xs representing white people and the dots</p> <p>22 representing black people?</p> <p>23 A. Yeah, because stroke when you are dealing with</p> <p>24 circle does the exact same thing resizing it, but when</p> <p>25 you are dealing with X if you make the stroke zero you</p> <p style="text-align: right;">201</p>	<p>1 look more heavily clustered?</p> <p>2 A. And isolated, yeah. Like I said, I started</p> <p>3 including white population, because I thought the</p> <p>4 black population alone was kind of an unfair look,</p> <p>5 because it didn't give a sense of the overall -- like</p> <p>6 what areas are populated and what areas are not.</p> <p>7 That's all I'm -- I'm not trying to do a comparative</p> <p>8 approach of the distribution of white and black</p> <p>9 residents, which I don't think has any relevance to</p> <p>10 anything. It is all about distribution of black</p> <p>11 population.</p> <p>12 There's just confusion about what's trying</p> <p>13 to be depicted here.</p> <p>14 Q. All right. Can we take a five-minute break.</p> <p>15 (Recess taken.)</p> <p>16 BY MS. THEODORE:</p> <p>17 Q. I want to return to one point we were talking</p> <p>18 about previously. You testified that rounding errors</p> <p>19 start canceling out after about 30 observations. Is</p> <p>20 that accurate?</p> <p>21 A. Yeah. The rule of thumb, that's right about</p> <p>22 I'd start to think they are going to cancel each other</p> <p>23 out mostly.</p> <p>24 Q. What's the basis for that rule of thumb?</p> <p>25 A. What I was taught in courses.</p> <p style="text-align: right;">203</p>
<p>1 don't have anything, because it is like using a pen,</p> <p>2 you have an infinitely small line.</p> <p>3 Q. Let's pull up Dr. Collingwood's rebuttal</p> <p>4 report, page 22.</p> <p>5 A. (Witness complies.)</p> <p>6 Q. This is a version that Dr. Collingwood did of</p> <p>7 your figure 16 that uses the same size dots for both</p> <p>8 races and swaps out the alpha parameters. Is that</p> <p>9 right?</p> <p>10 A. Yeah.</p> <p>11 Q. Okay. All right. Sitting here today you don't</p> <p>12 have any basis to believe you made any error in</p> <p>13 creating this figure 5?</p> <p>14 A. No. I'm fine with this.</p> <p>15 Q. Okay.</p> <p>16 A. I think it looks much worse for plaintiffs than</p> <p>17 what you drew.</p> <p>18 Q. All right. Do you think that your figure 16</p> <p>19 makes the white population of Pasquotank County look</p> <p>20 more substantial than it appears in Dr. Collingwood's</p> <p>21 version?</p> <p>22 A. I mean, possibly. But it makes the black</p> <p>23 population look a lot more heavily clustered and</p> <p>24 isolated, which is the point of the dot plots.</p> <p>25 Q. You think his figure makes the black population</p> <p style="text-align: right;">202</p>	<p>1 Q. Is there a book that says that somewhere?</p> <p>2 A. It is a rule of thumb, so no.</p> <p>3 Q. Okay. You haven't done any work to test out</p> <p>4 whether that rule of thumb applies to Census blocks,</p> <p>5 correct?</p> <p>6 A. No.</p> <p>7 Q. Okay. No, you haven't done any work to test</p> <p>8 that out?</p> <p>9 A. I have not done any work to test that out for</p> <p>10 Census blocks.</p> <p>11 Q. All right. I'm going to drop in the chat</p> <p>12 another exhibit, which I think are we on 14?</p> <p>13 (Deposition Exhibit No. 14 marked for</p> <p>14 identification.)</p> <p>15 BY MS. THEODORE:</p> <p>16 Q. Let me know when you have that open?</p> <p>17 A. Okay.</p> <p>18 Q. Okay. Scroll down to the second page.</p> <p>19 A. Okay.</p> <p>20 Q. Have you seen this -- well, this is a dot</p> <p>21 density plot, right?</p> <p>22 A. Yes.</p> <p>23 Q. Have you seen this before?</p> <p>24 A. Yeah, this looks like one of the dot density</p> <p>25 plots from Bethune Hill.</p> <p style="text-align: right;">204</p>

<p>1 Q. Okay. You see there that Dr. Rodden is using 2 black dots for black people and white dots for white 3 people against a gray background? 4 A. Yeah. 5 Q. Okay. He's using one dot for one person. Is 6 that right? 7 A. Yeah. That's why you are getting the over 8 plotting in the urban areas. 9 Q. Okay. Let's scroll down to the next to page 3. 10 Is that more zoomed in dot density plot 11 from Dr. Rodden in Bethune Hill? 12 A. Right. 13 Q. Okay. He's also using one dot for one person? 14 A. Yes. 15 Q. Black dots for black people, white dots for 16 white people? 17 A. Yeah, leaving out other races. 18 Q. Right. So Dr. Rodden's dot density maps in the 19 Bethune Hill case did not use rounding. Is that 20 correct? 21 A. I don't know if that's true of all of them, but 22 it is true of the ones you have shown me. 23 Q. You can't point, you are not aware sitting here 24 right now of any dot density plots that Dr. Rodden 25 used in the Bethune Hill case that used rounding?</p> <p style="text-align: right;">205</p>	<p>1 have been easier just to make up toy data, so there's 2 no question about it to give an example of how it 3 worked. But, yeah, the numbers might not be precise. 4 It is the process that matters. 5 Q. The process you describe is to weight the CVAP 6 data based on the BVAP data for block group, correct? 7 A. Well, there's a couple ways that people have 8 used to do it. I'm just trying to give a general 9 overview of how the process works. But the way I 10 understand it most commonly done is to use the VAP 11 data to weight the CVAP data, and then BVAP data to 12 weight the BCVPAP data. 13 Q. When you are using BVAP data to weight BCVPAP 14 data is it appropriate to appropriate to use any part 15 black BVAP data? 16 A. I think that's how I've seen it done. 17 Q. So your testimony is that the proper weighting 18 is to use any part block CVAP data rather than -- I'm 19 sorry. 20 Your testimony is that it is appropriate 21 to use any part black BVAP data rather than the three 22 VAP categories that correspond to the categories that 23 make up black CVAP data? 24 MR. STRACH: Objection. 25 A. My testimony is that there's a bunch of</p> <p style="text-align: right;">207</p>
<p>1 A. That's right. The one he uses in Williams have 2 rounding. These don't, because those are done at the 3 statewide level. 4 Q. Okay. What case is that? Williams? Do you 5 know what state that involves? 6 A. North Carolina. 7 Q. Can you turn to page 17 of your report? 8 A. (Witness complies.) 9 Okay. 10 Q. All right. Did you review the section of 11 Mr. Esselstyn's rebuttal report where he states that 12 -- let me start again. 13 On page 17 you describe how to do the 14 disaggregation process of disaggregating CVAP data at 15 the block group level to block level? 16 A. Right. 17 Q. Okay. Did you review the portion of 18 Mr. Esselstyn's report where he states that your 19 description on this page is incorrect? 20 A. Sort of. He said the numbers for the districts 21 were wrong, but I think the actual process which is 22 what I was interested in was right. 23 Q. Okay. Do you dispute that the numbers for the 24 districts are wrong? 25 A. I mean, I didn't look at it. Probably would</p> <p style="text-align: right;">206</p>	<p>1 different ways I've seen done with or seen this done. 2 I think the most common way is to use the BVAP data to 3 do it. 4 But, again, I don't, here I don't do this 5 analysis on my own. I just take the redistricting 6 data hub, because I figured using that number we could 7 avoid a nit picky fight over the different ways to 8 aggregate disaggregate the data. But there's no one 9 way to do it. 10 Q. Okay. 11 MR. STRACH: I've got to run out for a 12 little bit, so Erika is going to be in charge of 13 objections for however longer you have to go. 14 MS. THEODORE: Okay. 15 MR. STRACH: I hope I won't see you when I 16 get back, but if I do, then I'll step back in. 17 MS. THEODORE: Okay. I don't have too 18 much longer. 19 BY MS. THEODORE: 20 Q. Can you describe the work that you did to 21 respond to Dr. Mattingly's report in this case? 22 A. I took his code and ran it to see what the 23 Stephenson clusters would be. 24 Q. Okay. You don't offer any opinion in your 25 report about whether Dr. Mattingly's computer code</p> <p style="text-align: right;">208</p>

<p>1 correctly implements Stephenson. Is that right?</p> <p>2 A. That's right.</p> <p>3 Q. Okay. Let's turn to figure 25 on page 43 of</p> <p>4 your report?</p> <p>5 A. (Witness complies.)</p> <p>6 Q. This is a figure titled, "Suggested Stephenson</p> <p>7 Grouping map A." Is that right?</p> <p>8 A. Sorry. I was in Stephenson -- okay, yeah.</p> <p>9 Q. This is a figure which you purport to show</p> <p>10 Stephenson groupings if demonstration district A is</p> <p>11 frozen. Is that right?</p> <p>12 A. Yes.</p> <p>13 Q. All right. This figure was not produced by</p> <p>14 Dr. Mattingly's code or algorithm, was it?</p> <p>15 A. That's right.</p> <p>16 Q. How did you produce this figure?</p> <p>17 A. I ran his code and it gave me lists of county</p> <p>18 groupings and this is what I came up with.</p> <p>19 Q. Did you draw this in some mapping program?</p> <p>20 A. In R. It should be in the code I produced.</p> <p>21 Q. Okay. This figure puts Washington County in</p> <p>22 the wrong place, doesn't it?</p> <p>23 A. Yes.</p> <p>24 Q. Because Washington County should be grouped</p> <p>25 with demonstration district A?</p> <p style="text-align: right;">209</p>	<p>1 placed in group 9 and Washington ought not be placed</p> <p>2 there.</p> <p>3 Q. You say on page 42, "Dr. Mattingly reruns his</p> <p>4 code for determining the optimal Stephenson county</p> <p>5 groupings for maps A and C. This run forces Edgecombe</p> <p>6 and Pitt counties to remain together."</p> <p>7 Did I read that correctly?</p> <p>8 A. Yeah. I think I misunderstood from his report</p> <p>9 on that one. He clarifies that he didn't need to do</p> <p>10 it for I, I believe, map A, because Edgecombe and Pitt</p> <p>11 would be together as a default. So I misunderstood</p> <p>12 him.</p> <p>13 Q. Okay. So, in fact, Dr. Mattingly's run for map</p> <p>14 C does not force Edgecombe and Pitt counties to remain</p> <p>15 together?</p> <p>16 A. If that's the one, then yes. I know for one of</p> <p>17 them he didn't have to force them, because they</p> <p>18 naturally are produced together.</p> <p>19 Q. Okay. I'm sorry, we are going in the opposite</p> <p>20 direction of your report. Can we turn to page 41?</p> <p>21 A. (Witness complies.)</p> <p>22 Q. Here you say in middle of the first paragraph:</p> <p>23 "If we arrange the Census blocks in these counties" --</p> <p>24 you are talking about Edgecombe and Pitt -- "from</p> <p>25 highest BVAP to lowest and place a sufficient number</p> <p style="text-align: right;">211</p>
<p>1 A. Right.</p> <p>2 Q. Okay. What was responsible for this mistake?</p> <p>3 A. Coding error.</p> <p>4 Q. Coding error.</p> <p>5 A. I'm sorry. Let me be more specific, head this</p> <p>6 off at the pass. A coding error in the actual</p> <p>7 production of the map, not in the Stephenson groupings</p> <p>8 that were produced.</p> <p>9 Q. You told R, produce a map that has certain</p> <p>10 counties in certain places?</p> <p>11 A. Yeah. So...</p> <p>12 Q. Can you open up -- why don't you open up the</p> <p>13 code that we transferred earlier and maybe could you</p> <p>14 tell me where in the code this error occurs?</p> <p>15 A. I'm a step ahead of you. I'm just trying to</p> <p>16 find it.</p> <p>17 This doesn't have the, this doesn't have</p> <p>18 the line numbers that come in the native R</p> <p>19 implementation. But it is on like page 22 of the</p> <p>20 printout, starts on page 21.</p> <p>21 Q. Okay. Where is the error?</p> <p>22 A. On group 9, where it says Washington is in</p> <p>23 group 9. Group 9 is defined as counties. And then</p> <p>24 filter name in and then in that, the C for</p> <p>25 concatenate, there's a list of counties that should be</p> <p style="text-align: right;">210</p>	<p>1 of blocks in a district without regard even to</p> <p>2 contiguity to raise the population to the minimum</p> <p>3 population threshold for a state Senate district in</p> <p>4 North Carolina, the district would still be shy of</p> <p>5 50 percent BVAP."</p> <p>6 Do you see that?</p> <p>7 A. Yes.</p> <p>8 Q. How did you perform that analysis?</p> <p>9 A. That's in the R code as well.</p> <p>10 Q. Okay. Did the R code spit out some sort of</p> <p>11 like CSV file output?</p> <p>12 A. No.</p> <p>13 Q. What does the R code spit out that allows you</p> <p>14 to reach that conclusion?</p> <p>15 A. So it takes the blocks and it arranges them</p> <p>16 from highest BVAP to lowest, so it is within a data</p> <p>17 frame or tibble, and then creates a cumulative list of</p> <p>18 the population and the black population as you add</p> <p>19 successively lower BVAP blocks to your quote unquote</p> <p>20 district. And then when you get to the minimum</p> <p>21 population threshold, it looks at the BVAP of that</p> <p>22 quote unquote district and it is below 50 percent.</p> <p>23 Q. That's just in the console that you are looking</p> <p>24 at R in. Is that right?</p> <p>25 A. Right.</p> <p style="text-align: right;">212</p>

1 Q. Okay. So that's not saved anywhere?

2 A. No, but it is replicable.

3 Q. Okay. All right. You are familiar with the

4 rule for creating groupings of counties described in

5 Stephenson in subsequent North Carolina Supreme Court

6 cases?

7 A. I think so.

8 Q. All right. What's your understanding of that

9 rule?

10 A. My understanding is that you draw the

11 districts, the -- I know there's dispute between the

12 parties as to exactly how you are supposed to account

13 for the Voting Rights Act. My understanding is a

14 little firmer, setting that aside, that you draw the

15 single county districts or single county groupings

16 first. Then you look for groupings of two counties

17 and place them together. Three counties, so forth.

18 Q. You say on page 25 of your report, "if counties

19 were to split, which I understand to violate the

20 Stephenson rule."

21 Do you see that?

22 A. Yes.

23 Q. All right. Are you aware that the enacted

24 state Senate maps splits 15 counties?

25 A. Yes. It is not a per se rule against splitting

213

1 counties.

2 Q. Okay. Did you review the portion of

3 Dr. Mattingly's report where he explains that

4 Stephenson does not minimize the splitting of

5 counties?

6 A. I know that to be true.

7 Q. Okay. Do you have an understanding of the term

8 performing crossover district in the context of the

9 Voting Rights Act?

10 A. It's a district that is short of 50 percent

11 that's not a black majority district or a majority

12 minority district, minority majority, but that

13 nevertheless will elect an minority candidate of

14 choice, where the minority group is reliant on the

15 votes of a sufficient number of white voters.

16 Q. Okay. Have you done performance analysis in

17 your prior work in VRA cases?

18 A. Yeah.

19 Q. How do you assess whether a district is

20 performing?

21 A. My understanding is you look to see how

22 statewide candidates have run in the district in the

23 past who are the minority candidate of choice.

24 Q. Okay. You agree that when assessing the

25 performance of a district with changed boundaries the

214

1 best practice is to use statewide races, correct?

2 A. I think it is tricky to use the, to add

3 together state Senate races, because you introduce a

4 certain degree of variance for lack of a better term

5 that isn't going to be present in the statewide races.

6 You get different candidates, candidates with

7 different degrees of funding, so forth, whereas all

8 that is held constant if you are using a statewide

9 race.

10 Q. Okay. So the best practice when you are

11 assessing performance of a district with changed

12 boundaries is to use statewide races?

13 MS. PROUTY: Objection.

14 A. I would generally use the statewide races.

15 There might be like case specific instances where it

16 is better not to, but as a general rule I think that's

17 right.

18 Q. Okay. Do you have an understanding of the term

19 opportunity district in the context of the Voting

20 Rights Act?

21 MS. PROUTY: Objection.

22 A. Yeah.

23 Q. What's your understanding?

24 A. So I have an understanding of it. I never had

25 it entirely fleshed out. But my general understanding

215

1 is that it is a district where the minority group has

2 an opportunity, an ability at least in some

3 circumstances to elect its candidate of choice. I'm

4 not sure exactly where that threshold lies, but that's

5 my understanding.

6 Q. Have you taken the position or reached a

7 conclusion in prior expert work that a particular

8 district was an opportunity district?

9 A. I believe in Soto Palmer we did this analysis.

10 We did some of this analysis in the Arizona and

11 Virginia cases of where the districts would perform.

12 Q. Was there a threshold you applied for, to

13 decide whether you thought something was an

14 opportunity district?

15 A. I don't remember. But I think that's more of a

16 legal term than an expert term. I mean, what

17 qualifies an opportunity for the Voting Rights Act, I

18 would say the black candidate of choice wouldn't have

19 to win all the races, but maybe more, I mean, I don't

20 know if one of 10 would cut it either, but I don't

21 know. Maybe it is you have an opportunity if it is

22 just some race that the minority candidate of choice

23 has one.

24 I really think that's more of a legal

25 issue than an expert issue.

216

<p>1 Q. Okay. Have you done any analysis of whether</p> <p>2 district 5 in the enacted Senate map is a performing</p> <p>3 crossover district?</p> <p>4 A. No.</p> <p>5 Q. All right. You haven't done any analysis of</p> <p>6 whether any district in the enacted Senate map is a</p> <p>7 performing crossover district, have you?</p> <p>8 A. That's correct.</p> <p>9 Q. All right. So you are not going to offer any</p> <p>10 opinions on that topic?</p> <p>11 A. No. I understand that another expert is</p> <p>12 handling that portion.</p> <p>13 Q. All right. I think that if we take like a</p> <p>14 15-minute break right now -- can we go off the record?</p> <p>15 (Recess taken.)</p> <p>16 BY MS. THEODORE:</p> <p>17 Q. Okay. All right. Dr. Trende, I just want to</p> <p>18 follow up on one thing you mentioned before. You said</p> <p>19 you thought that Dr. Rodden had done dot density plots</p> <p>20 using one dot for 100 people in a case called Williams</p> <p>21 in North Carolina. Is that right?</p> <p>22 A. That's right.</p> <p>23 Q. Do you know around when that case was?</p> <p>24 A. It is, it is ongoing.</p> <p>25 Q. Ongoing, okay.</p> <p style="text-align: right;">217</p>	<p>1 differential privacy was introduced, which is what</p> <p>2 would be a new problem for the aggregation</p> <p>3 disaggregation analysis.</p> <p>4 Q. Your testimony is that before 2020 the Census</p> <p>5 Bureau did not alter data at the block level related</p> <p>6 to race?</p> <p>7 A. My understanding is that's when the</p> <p>8 differential privacy rules for race were introduced,</p> <p>9 but I could be wrong on that.</p> <p>10 Q. All right. I'm going to transmit another</p> <p>11 exhibit. I think we're at 15.</p> <p>12 (Deposition Exhibit No. 15 marked for</p> <p>13 identification.)</p> <p>14 BY MS. THEODORE:</p> <p>15 Q. So I'll mark this as 15. Let me know when you</p> <p>16 have it pulled up?</p> <p>17 A. Okay.</p> <p>18 Q. Do you recognize this document?</p> <p>19 A. No.</p> <p>20 Q. You have never read this before?</p> <p>21 A. I don't think so.</p> <p>22 Q. This isn't the document that you cite on page</p> <p>23 18 to support your statement that beginning with the</p> <p>24 2020 Census data at the block level were randomly</p> <p>25 altered to mask individuals' identities including</p> <p style="text-align: right;">219</p>
<p>1 Is that the name of the current case right</p> <p>2 now that involves the Senate house and Congressional</p> <p>3 districts?</p> <p>4 A. Yeah. It is what I refer to it as. I'm sure</p> <p>5 there's two cases consolidated, so it might be the</p> <p>6 other one that most people are using.</p> <p>7 Q. Got it. Okay. Thanks.</p> <p>8 Okay. On page 18 of your report you say,</p> <p>9 "beginning with the 2020 Census data, data at the</p> <p>10 block level were randomly altered to mask individuals'</p> <p>11 identities including racial data."</p> <p>12 Do you see that?</p> <p>13 A. Yes.</p> <p>14 Q. Okay. Data at the block level were altered on</p> <p>15 the decennial Census to mask individual identities</p> <p>16 before the 2020 Census. Isn't that true?</p> <p>17 A. Yeah. That's right. That's another one that</p> <p>18 could have used some better wordsmithing.</p> <p>19 For example, differential privacy could</p> <p>20 have coded, would have altered the answers on income,</p> <p>21 so that you couldn't figure out exactly what Bill</p> <p>22 Gate's income was. Or that he wouldn't skew, you</p> <p>23 know, his block group. So, yeah, there's some of that</p> <p>24 that occurs before this.</p> <p>25 I believe the 2020 Census is when race</p> <p style="text-align: right;">218</p>	<p>1 racial data?</p> <p>2 A. Okay. Then, yeah, I guess I have, if that's</p> <p>3 what this is.</p> <p>4 All right.</p> <p>5 Q. Is this that document?</p> <p>6 A. I don't know. I haven't looked at the document</p> <p>7 in a very long time. But if you are representing to</p> <p>8 me that's what this is, I don't have a reason to</p> <p>9 dispute you.</p> <p>10 Q. You filed this report in August, right?</p> <p>11 A. Yes.</p> <p>12 Q. So you looked at the document -- you looked at</p> <p>13 the document cited on page 18 in August?</p> <p>14 A. Probably in July.</p> <p>15 Q. Okay.</p> <p>16 A. I think we have established that I've done like</p> <p>17 three cases since then, so I don't remember -- no, I</p> <p>18 don't remember what every document that I looked at</p> <p>19 looks like today.</p> <p>20 Q. All right. Do you see there's a URL at the</p> <p>21 bottom of that document?</p> <p>22 A. Yes.</p> <p>23 Q. Does that look like the URL that you are citing</p> <p>24 on page 18?</p> <p>25 A. Yes.</p> <p style="text-align: right;">220</p>

<p>1 Q. Okay. Can we scroll down to page 2 of this 2 document? 3 A. (Witness complies.) 4 Q. You see a section there that's titled, "due to 5 privacy concerns reported data has always been 6 different from raw data"? 7 A. Yes. 8 Q. Okay. You understand that to be talking about 9 the Decennial Census, correct? 10 A. Yes. 11 Q. All right. The document says, "since 2000 the 12 Bureau has used data swapping between Census blocks 13 as its main disclosure avoidance technique." 14 Do you see that? 15 A. Yes. 16 Q. Then it goes on to give a hypothetical example 17 in which it uses data swapping to switch data about 18 race between Census blocks. Do you see that? 19 A. I think that's ancestry. 20 Q. Is it your testimony that in prior Census 21 iterations the Census Bureau swapped ancestry data 22 between Census blocks, but not race data? 23 A. I don't know if it used, if it swapped ancestry 24 going back to 2000, but my understanding -- I could be 25 wrong on this -- my understanding was racial data was</p> <p style="text-align: right;">221</p>	<p>1 kept invariant along with most data at the Census 2 block level with the exception of race." 3 A. Yeah. But something changed with what they do 4 with race and ethnicity data. Maybe I wasn't precise 5 in how I put it, but in the very next paragraph it 6 says, you highlighted, "race and ethnicity data are 7 likely to be further from the as enumerated data than 8 in past decades when data swapping was used to protect 9 small populations." 10 So something happened to make these data 11 at the block level for race worse, which is going to 12 make this aggregation disaggregation more difficult 13 than it's been in the past, because what you are using 14 as the basis for weighting you have less confidence in 15 than we had in the past. 16 Q. Okay. That's because we have less confidence 17 in the decennial Census data, correct? 18 A. Right. 19 Q. Okay. Do you agree that American Community 20 Survey data is used to allocate trillions of dollars 21 to communities across the United States? 22 A. Yeah. I don't think the ACS data is inherently 23 invalid. That's never been my testimony or my 24 position. 25 Q. Okay. I want to go back to demonstration</p> <p style="text-align: right;">223</p>
<p>1 new for 2020. 2 So like if you go to the third page where 3 things are highlighted, "race and ethnicity data are 4 likely to be further from the as enumerated data than 5 in past decades." 6 Q. All right. Do you see the paragraph on page 3 7 that says, "in 2010 and previous decades all of these 8 were kept invariant along with most data at the Census 9 block level with the exception of race"? 10 A. Yes. 11 Q. Okay. So you understand based on that that the 12 Census Bureau was altering racial data at the Census 13 block level in Censuses prior to 2020? 14 A. I don't, because from the sentence before it 15 something has changed, because it says, "race and 16 ethnicity data are likely to be further from the as 17 enumerated date than in past decades." 18 Q. I'm talking about the sentence in the prior 19 paragraph. Do you see that? 20 A. No. It is in the same paragraph. I think. 21 You read the sentence in 2010 at the block level total 22 population, et cetera, were all held invariant, right. 23 Q. No. In the prior paragraph I read -- 24 A. Okay. 25 Q. -- "in 2010 and previous decades all these were</p> <p style="text-align: right;">222</p>	<p>1 district E. You said you hadn't formed any opinions 2 about demonstration district E. Is that right? 3 A. Yes. 4 Q. Was that your choice not to form any opinions 5 about demonstration district E? 6 MS. PROUTY: Objection. To the extent you 7 are asking for his conversations with counsel, I'm 8 going to instruct him not to answer. 9 A. I can't answer that question. 10 Q. You can't answer whether it was your choice 11 not to reach any conclusions about demonstration 12 district E? 13 MS. PROUTY: Same objection. 14 A. I can't answer that. 15 Q. Did counsel instruct you not to reach any 16 conclusions about demonstration district E? 17 MS. PROUTY: Same objection. I instruct 18 the witness not to answer. 19 A. I can't reveal conversations with counsel. 20 Q. Were you asked to analyze demonstration 21 district E? 22 MS. PROUTY: Same objection. 23 A. Same answer. I can't reveal conversations I 24 had with counsel. 25 MS. THEODORE: Your position is that</p> <p style="text-align: right;">224</p>

<p>1 questions about what Dr. Trende was asked to do as 2 part of his expert report are privileged? 3 MS. PROUTY: I think you are asking 4 whether or not he was asked to analyze something 5 that's not currently in his report. 6 MS. THEODORE: Throughout all of these 7 depositions, including of our experts, you have asked 8 questions about what the witnesses were asked to do. 9 You are saying I can't ask Dr. Trende what he was 10 asked to do for purposes of his expert work in this 11 case? 12 MS. PROUTY: I would have to confer with 13 some of my colleagues to understand. If you want to 14 let me take the opportunity to do that, I'm happy to 15 do that. If you want to move on based on the answer 16 he's provided, we can do that as well. 17 BY MS. THEODORE: 18 Q. Dr. Trende, you could have formed opinions 19 about demonstration district E between when it was 20 provided to you in August and today. Isn't that 21 right? 22 A. I don't know. I haven't looked into it. I 23 assume I could have performed some sort of or come to 24 some sort of opinion about it. 25 Q. You understand that the rebuttal report was</p> <p style="text-align: right;">225</p>	<p>1 instructing him not to answer the question of whether 2 he was asked to analyze demonstration district E? Is 3 that right? 4 MS. PROUTY: That's correct. 5 BY MS. THEODORE: 6 Q. Did you ever tell counsel that you would have 7 been able to analyze demonstration district E if you 8 had more time? 9 MS. PROUTY: Same objection. I'm going to 10 instruct the witness not to answer. 11 A. I've been instructed not to answer, so I will 12 not answer. 13 Q. Okay. 14 MS. THEODORE: All right. I'm just going 15 to take a short break. I want to confer on our 16 response to your instruction not to answer. 17 MS. PROUTY: Sure. Help me understand, 18 your first question is whether he was instructed not 19 to analyze demonstration E, correct? 20 MS. THEODORE: Correct. 21 MS. PROUTY: Your second question is 22 whether he, in fact, analyzed Demonstration E or not. 23 Is that correct? 24 MS. THEODORE: I believe that he has 25 testified that he did not analyze demonstration</p> <p style="text-align: right;">227</p>
<p>1 disclosed on August 30th, correct? 2 A. Or thereabouts is my recollection. 3 Q. Okay. Today is September 30th. Is that right? 4 A. Yeah. 5 Q. All right. Is one month long enough to reach 6 conclusions about a demonstration district? 7 A. It depends what else you have going on in that 8 month. If you have produced 170 pages of expert 9 report in another matter, probably not. 10 Q. I'm going to ask again: Were you instructed 11 not to analyze demonstration district E? 12 MS. PROUTY: Objection. I think the way 13 you are asking this is asking for information that is 14 protected by the attorney-client privilege. 15 To the extent you want to ask him has he 16 analyzed demonstration district E, which I believe he 17 has answered, that's different. But you are asking 18 about his instructions from counsel, which I don't 19 believe we have asked your experts about. 20 MS. THEODORE: I think you have repeatedly 21 asked our experts about questions involving 22 instructions from counsel. 23 All right. So you are instructing him not 24 to answer a question of whether he was instructed not 25 to analyze demonstration district E and you're</p> <p style="text-align: right;">226</p>	<p>1 district E. 2 BY MS. THEODORE: 3 Q. That's correct, Dr. Trende, right? 4 A. That's correct. I have not. 5 MS. THEODORE: Okay. 6 MS. PROUTY: What is your second question? 7 MS. THEODORE: My second question is 8 whether he was asked to analyze demonstration 9 district E. 10 MS. PROUTY: Okay. 11 MS. THEODORE: My third question was 12 whether he told counsel that to analyze demonstration 13 district E he would need more time? 14 MS. PROUTY: Sure. Let me confer on my 15 end as well to see if there's a way that he could 16 answer those questions, but for now those are our 17 objections and instructions. 18 MS. THEODORE: Can we come back in like 5 19 minutes? 20 MS. PROUTY: Sure. 21 (Recess taken.) 22 MS. THEODORE: I have no more questions. 23 Thank you, Dr. Trende. 24 MR. STRACH: We have no questions. 25 THE REPORTER: Read and sign?</p> <p style="text-align: right;">228</p>

<p>1 MR. STRACH: Yes.</p> <p>2 THE REPORTER: Are electronic transcripts</p> <p>3 good for everybody?</p> <p>4 MS. THEODORE: Yes.</p> <p>5 MR. STRACH: Works for us. I don't think</p> <p>6 we need anything expedited.</p> <p>7 MS. PROUTY: We'll follow up if we do.</p> <p>8 (The deposition concluded at 5:16 p.m.)</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p> <p>229</p>	<p>1 STATE OF NORTH CAROLINA)</p> <p>2) SS:</p> <p>3 COUNTY OF GUILFORD)</p> <p>4 I, Vincent Bailey, Certified Shorthand</p> <p>5 Reporter, do hereby certify that SEAN TRENDE, PH.D. on</p> <p>6 September 30, 2024 was by me first duly sworn to</p> <p>7 testify to the truth, and that the above deposition</p> <p>8 was recorded stenographically by me and transcribed by</p> <p>9 me.</p> <p>10 I FURTHER CERTIFY that the foregoing</p> <p>11 transcript of said deposition is a true, correct, and</p> <p>12 complete transcript of the testimony given by the said</p> <p>13 witness at the time and place specified.</p> <p>14 I FURTHER CERTIFY that I am not a relative</p> <p>15 or employee or attorney or employee of such attorney</p> <p>16 or counsel, or financially interested directly or</p> <p>17 indirectly in this action.</p> <p>18 IN WITNESS WHEREOF, I have set my hand.</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p> <p>Vincent Bailey</p> <p>Certified Shorthand Reporter</p> <p>231</p>
<p>1 IN UNITED STATES DISTRICT COURT.</p> <p>2 FOR THE EASTERN DISTRICT OF NORTH CAROLINA</p> <p>3 EASTERN DIVISION</p> <p>4 Case No. 4:23-CV-00193-D</p> <p>5 RODNEY D. PIERCE and MOSES)</p> <p>6 MATTHEWS)</p> <p>7)</p> <p>8 Plaintiffs,)</p> <p>9)</p> <p>10 vs.)</p> <p>11)</p> <p>12 THE NORTH CAROLINA STATE)</p> <p>13 BOARD OF ELECTIONS, et al.,)</p> <p>14)</p> <p>15 Defendants.)</p> <p>16</p> <p>17 I, _____,</p> <p>18 do hereby certify that I have read the foregoing</p> <p>19 transcript of my deposition consisting of pages _____</p> <p>20 through _____, inclusive; and I find it is a true and</p> <p>21 correct transcript of my deposition so given as</p> <p>22 aforesaid.</p> <p>23</p> <p>24</p> <p>25</p> <p>Subscribed and sworn to</p> <p>before me this _____ day</p> <p>of _____, 2024.</p> <p>Notary Public</p> <p>230</p>	

A	121:5 130:17	35:2,3,10,12	52:12 53:18	179:1 180:6,15
Abbott 30:14	131:8,11,15	43:17 44:25	54:23 106:6	223:19
31:8	223:22	62:6 63:3	116:14 117:14	Americans
ability 216:2	Act 16:6 23:22	64:12,19 65:6	120:22 210:15	36:11
able 26:14 49:1	24:2 25:15,20	65:16,24 80:7	AI 20:2	analyses 22:3
171:1 189:21	25:22 29:13	80:7 87:15	al 1:7 230:7	analysis 13:18
190:15 199:2	213:13 214:9	137:1 138:8	alarm 96:10	13:23 16:3,14
227:7	215:20 216:17	139:4 152:21	Albemarle	18:4,20 19:4,8
absence 60:11	action 27:23	155:17,21	147:22	19:11,14,17
academia 19:23	231:9	162:21 163:3	Alford 127:21	20:12 21:8,21
academic 23:13	actual 33:25	164:7,12	algorithm	22:3,12 31:4
24:1,4,8 25:5	34:21,22,24	169:19 174:3	209:14	107:22 127:14
188:3	36:14,20 64:19	174:12,13,23	Allen 15:5,6	128:11,13,19
accept 132:17,22	65:15,24 102:5	175:1,2,10,11	16:25 17:1	134:6 138:5
acceptable	102:17 103:23	175:15 176:19	31:12,16 59:14	139:13 141:21
109:11 194:17	114:17 118:2	176:20,22	59:15,18 79:9	141:25 155:11
accepted 152:8	120:15 177:15	177:1,10,16,17	160:7	160:13 163:23
184:2,18 185:1	178:9 193:14	Agee 28:7 30:21	allocate 223:20	180:20 184:14
account 22:15	206:21 210:6	31:10	allow 48:10	190:6 208:5
22:16 51:11	add 62:16	aggregate	151:7	212:8 214:16
213:12	115:22 142:2	106:11 182:10	allowable 165:5	216:9,10 217:1
accurate 5:5	176:24 177:9	183:25 186:5	allowed 48:6	217:5 219:3
14:22 47:20	180:15 212:18	189:6 190:9	51:16	analyze 16:7
95:8 101:18	215:2	191:16 194:16	allowing 47:17	224:20 225:4
102:1 105:9	added 178:21	195:1 208:8	48:16 49:3	226:11,25
141:19 142:2,3	adding 85:14	aggregated 87:5	51:4 150:12	227:2,7,19,25
146:23 186:6	86:11 142:4	106:18 183:17	allows 52:9	228:8,12
194:20 195:14	179:1	aggregating	151:1 212:13	analyzed 18:8
196:17 203:20	additional 13:23	105:15	Almanac 20:10	20:13 113:1
achieve 137:2	14:6,9	aggregation	alpha 200:3,7,11	226:16 227:22
160:3	address 37:22	219:2 223:12	200:25 201:9	analyzing 13:25
acknowledge	201:2,10	ago 48:23 49:22	201:10 202:8	ancestry 221:19
147:3	addressed 25:12	90:8 169:10	alter 219:5	221:21,23
acronym 22:21	adjacent 22:13	agree 34:25	altered 218:10	and- 2:8
ACS 12:25	195:20	36:17 40:13,23	218:14,20	angle 24:17
27:17 34:3	adjoining 93:14	84:15,25 94:25	219:25	announced
35:16 37:2,7	114:15 157:1	102:6 108:20	altering 119:9	134:18
37:10,17,25	adjusting	109:3 111:16	222:12	answer 4:25 5:1
38:2,7,12,20	112:18	114:17 127:22	alternative 33:6	7:25 8:14 14:1
39:2,8 40:7	adjustments	134:13 144:6	42:22 43:5,11	14:2 24:24
44:13 54:8,16	32:23	159:17 168:16	46:11 53:12	25:3 30:3
54:20 57:22	admit 142:17	183:7,9 187:5	156:16 164:3	34:12 35:14,15
61:19,21 63:13	144:9	214:24 223:19	amendment	35:17 39:20,23
63:16 64:6,16	admitting 40:4	agreement	17:8 29:19	40:1 45:12,13
64:24 65:22,22	advisor 25:21	102:19 103:15	American 20:10	63:13 64:6
65:23 80:9	aerial 22:1	ahead 28:22	33:20,24 36:23	76:7 77:11
83:19 86:21	affirm 135:14	29:9 35:5	40:14 62:2	84:17 86:9
100:1 105:12	aforesaid 230:12	37:16 38:25	63:11 79:14,25	90:15 102:2
105:17,22	age 24:5 33:10	39:6,18 40:11	85:17 90:2,6	107:8,11 108:5
120:1,3 121:4	34:6,16,23,25	48:2,22 50:19	126:13 178:21	110:16 132:7

136:11 145:18 145:21,22,22 148:11 167:8 171:21 198:5 224:8,9,10,14 224:18,23 225:15 226:24 227:1,10,11,12 227:16 228:16 answered 63:9 63:25 64:8 120:23 159:12 226:17 answering 4:22 178:5 answers 77:18 77:23 78:3 128:18 132:10 150:4 218:20 anybody 64:23 65:12 147:5 anyway 78:23 API 70:10 apparent 192:12 apparently 199:3 appear 144:18 159:14 171:24 APPEARANC... 2:1 appeared 2:5,12 appears 154:20 202:20 appendages 51:22 52:19 167:21 168:2 Apples 187:4 applicable 150:6 application 21:8 21:19 22:22 applied 112:7 216:12 applies 204:4 apply 162:9 163:21 167:16 167:23 appreciate 71:11 approach 22:20 93:7 108:14 125:14 137:14	152:6,8 169:22 203:8 approached 9:12 appropriate 16:15 90:4 110:11 161:15 207:14,14,20 approximately 11:14 approximations 21:20 April 59:20 Ardoin 31:13,15 area 8:1 50:25 72:25 75:5 111:5 144:16 153:6 155:3,4 158:17,25 172:19,20 173:10,14 183:11,14 185:9,12,15 188:1 198:25 areas 41:5 149:24 156:21 157:1 170:17 176:8 203:6,6 205:8 argue 176:11 arguendo 30:12 arguing 143:15 Arizona 23:6 216:10 arm 153:1,7,14 153:24 154:12 158:18,21 160:22 161:1,5 161:9,15,19,21 162:3 166:2,25 167:10,17 arms 51:22 52:19 167:21 168:2 Arnold 2:2 4:8 arrange 211:23 arranges 212:15 art 136:6,7,12 article 23:18,21 25:7	articles 20:4,8 133:20 ascribed 53:3 Asian 36:11 aside 103:16 185:6 213:14 asked 13:13 44:7 44:23 45:2 50:3,8,9 58:3,3 59:24 60:14,15 60:15,18,19,23 61:5 62:22 114:23 145:4 151:19,23 152:4 167:20 168:11 176:12 224:20 225:1,4 225:7,8,10 226:19,21 227:2 228:8 asking 25:2 34:13,13,14,24 35:9 37:24 45:7 50:11 108:3 145:15 145:17 153:11 167:6 198:20 198:20 224:7 225:3 226:13 226:13,17 assert 157:24 assess 214:19 assessing 36:14 214:24 215:11 assessment 190:21 assigned 97:18 98:5,8,10 assignment 10:23 17:11 92:4,15 assigns 94:22,25 assistance 10:17 associated 59:12 59:23 61:11,16 assume 14:12 17:25 38:18 131:6 154:8 155:25 158:14 225:23	assuming 37:21 131:20 151:11 assumption 22:8 39:9 188:24 assumptions 39:20,21,22 attack 45:19 attacks 57:16 attempt 32:23 33:25 188:19 attempting 33:6 87:12 attention 127:19 166:21 attorney 231:8,8 attorney-client 226:14 attributable 116:11,16 August 10:7,15 10:23 11:8,15 11:20 14:18 31:19 79:1 220:10,13 225:20 226:1 authenticate 67:25 available 33:23 105:20 Ave 2:3 average 67:11 69:15,21 70:18 71:1 74:11 averages 131:1 averaging 131:3 avoid 208:7 avoidance 221:13 aware 33:18,22 36:22 38:10 40:6 41:3,9,14 53:5 72:5 91:17 134:3,17 152:13 155:12 155:20 188:3 199:9,12,21 205:23 213:23 awful 172:20 Ayscue 58:6,14	B B 3:4 91:5 92:1 94:1 97:10,18 103:20 104:8 104:11,22 152:18 153:10 153:19,20 154:24 156:16 156:22 159:11 B's 155:12 B-1 99:9 154:9 157:3,18 158:12 B-2 156:23 back 26:24 58:6 59:5 74:4 76:8 77:18 94:5 95:7,13 96:13 99:15 100:10 100:18 102:20 106:10 108:19 130:12,14 137:12 158:18 162:12 169:2 173:21 179:14 184:21 208:16 208:16 221:24 223:25 228:18 background 147:3 197:9,20 205:3 backup 161:24 Bailey 1:12 130:13 231:3 231:12 Baker 2:9 balance 143:20 ballot 23:3,4 134:16 Banks 8:24 9:3 bare 61:9 barely 154:18 Bartlett 44:17 based 67:7 81:10 83:8 91:3 129:5 133:20 134:9 146:23 152:1,4 155:7 158:9 161:24 207:6 222:11
--	---	---	---	--

225:15	believed 103:20	35:2,7,10,12	162:4,10,18,21	73:9,14 74:2
basic 66:19	Bellwether	36:12,13 38:16	162:24 163:7	74:13 78:18
111:13	23:19	38:17,22 39:3	164:6,8 165:18	91:3,8,15,18
basically 24:19	belt 9:6,10 26:20	39:15 40:9	165:23 169:19	91:24 92:4,5,9
181:18	27:1	61:18,20,21,24	173:22 174:3	92:11,14,15,18
basis 22:2 26:6	Benson 28:7	61:24 62:1,1,1	175:9 176:8,19	92:22 93:2,13
27:13 55:16	30:22 31:10	62:4,5,6,8,9	176:25 177:9	93:14,18,21,25
75:13 100:21	Bernie 36:3,6	63:2,3,5,6,11	177:14,16,20	94:22 95:8,15
100:23 117:16	Bertie 112:17	63:12,12,14,15	177:25 178:4	96:17,25 97:4
127:13 151:21	138:24 139:7	63:17,20,21	178:14 179:2	97:10,17,25
154:20 158:1,4	141:4 143:19	64:3,3,7,12,17	180:17 181:24	98:1,4,4 99:8
159:15,22	best 4:23 31:5	64:20,24,25	182:19,23	99:10,25
160:8 169:13	58:24 62:25	65:1,4,7,13,14	183:12,13	100:15 102:9
175:18 194:18	167:9 215:1,10	65:17,20,23,25	185:10,11	102:17 103:19
202:12 203:24	Bethune 169:3	79:3 80:2,6,17	186:1,2 187:5	103:25 104:4,5
223:14	184:22 185:4	80:24 81:2,6	187:11,12,12	104:25 105:16
Bayesian 22:18	196:5 204:25	83:2,7,13,23	187:20 192:10	105:16,24
bayou 178:16	205:11,19,25	83:25 84:3	193:1,8 194:9	106:4,11,25
BCVAP 97:21	better 22:4	85:6,8,11,15	194:21 195:8	110:8,11,12,12
102:10,18	49:11 122:13	85:16,16,17	196:9,22 197:1	110:25 111:3,7
130:9 207:12	131:2 137:5	86:6 87:14,22	197:10,10,20	112:6,15 113:2
207:13	141:22 142:5	87:22 88:11,24	199:23 200:10	113:13,21
beginning 218:9	144:9 168:6	88:25 89:6,7	200:16,20	114:19,21
219:23	176:10,15,16	89:19,19,23	201:10,13,22	115:2,4,8,11
begins 172:8,15	178:4,9,17	90:1,1,2,5,6,6	202:22,25	115:12,23
behalf 2:5,12	182:8,14 184:4	97:3,9 99:9,25	203:4,8,10	116:11 117:25
28:2,12,18	185:7 188:18	100:15 101:11	205:2,2,15,15	118:23 119:17
behavior 18:16	198:4 199:6	101:21 102:5	207:15,21,23	119:25 120:13
19:17 24:9,15	215:4,16	103:2,12	212:18 214:11	120:18,20
25:16	218:18	108:22 111:17	216:18	121:15 122:2,5
behaviors 25:4	bias 39:2,8,10,13	111:21,24	blank 73:5	122:8,15,18,22
belief 58:25	39:14,15 40:1	112:2,9,16	blanking 72:4	122:25 123:2,3
believe 9:21	40:7	114:18 121:25	185:5	123:11 124:16
11:11 12:10,11	big 15:11 22:8	123:18 124:21	blended 150:15	124:19,20
12:23 14:8,24	69:19 101:20	124:25 125:2,5	blind 148:9	125:2,8,10
15:24 16:12	bigger 170:19	125:9,11 129:4	151:5 171:9,12	126:11,14,17
19:15 21:3	Bill 218:21	129:21,24	197:3	126:24 128:3
23:10 24:7,10	bin 148:19,22,23	134:14 136:25	blob 172:21	148:1,6,14,17
25:11 26:25	149:6,7,10	137:2,9,17,23	173:12,16	151:3,8 158:10
28:10 32:22	binomial 189:4	138:4,8,13,15	184:11 193:5	158:22 159:4
41:20 55:8	190:9	138:22,23,25	blobs 172:24	170:1,9,14,17
82:7 91:13	bit 45:18 58:21	139:2,9 140:6	173:15	172:17 175:22
135:23 140:14	62:13 96:14	140:8,11	block 40:16 41:7	175:24 180:25
161:3 186:21	144:9 157:8	142:20,22,24	41:11 56:7,11	181:4,5,8,10
189:8 190:4	208:12	143:6 152:20	56:11,19,19,25	181:21,23,24
192:9 194:16	bits 92:13	152:25 155:17	66:20 67:15	182:17,21
202:12 211:10	bizarre 52:20	155:21 156:4	68:9,14 69:24	183:1 185:13
216:9 218:25	black 9:6,10	156:14,18	70:2,5,18,23	187:18 188:13
226:16,19	26:19 27:1	157:1,20 159:4	70:25 71:14,21	188:15 189:7
227:24	34:5,6,15,16	160:4,19,21	72:2,20,25	189:10,13,16

189:17,24	boil 51:24	Bureau 19:3	calculate 33:14	189:6,14
191:6,8,11	bones 61:9	27:10 33:20,24	55:5,21 56:5,9	190:10,17,19
192:14,19,21	bonus 23:4	37:5 38:8	57:20 59:12,22	190:22 191:2
193:15 194:14	book 20:13,19	61:25 64:18	63:2 71:17	191:17 203:22
194:15 195:6	20:21,21 21:1	65:15 67:24	80:17 81:1	canceled
195:12,13,16	21:1 204:1	68:8,20 69:23	82:14 83:1,17	203:19
195:19 206:15	border 91:18	78:11,14	84:2 85:7,14	cancellation
206:15 207:6	93:16 158:11	104:14,19	86:5 87:5,13	189:22
207:18 218:10	201:17	108:21 111:16	87:21 88:10	cancelled 39:14
218:14,23	borders 158:16	112:10,21	99:25 100:14	cancels 182:10
219:5,24 222:9	bottom 86:19	113:5 129:3	103:17,23	183:24
222:13,21	95:10 102:22	219:5 221:12	108:22 111:21	candidate
223:2,11	124:4 146:17	221:21 222:12	127:5 153:21	214:13,23
blocks 66:20	220:21	Bureau's 111:14	calculated 55:12	216:3,18,22
68:9,15 74:14	boundaries	busy 60:21 61:2	58:6,15 61:10	candidates
78:19 98:7,10	49:10,19 93:17	BVAP 50:14	61:15 67:1	214:22 215:6,6
146:22 150:1,2	156:22 157:2	137:16,25	79:8 81:10	Carolina 1:1,7
158:24 162:16	157:17 166:3	138:11 139:19	83:8 97:25	6:19 7:2,5,9
164:2,19 165:3	176:15 214:25	140:24 141:4	98:3 109:4	9:9 15:12
165:8,11,17,22	215:12	141:17 142:23	176:18	16:20 17:1
169:12 170:11	boundary	144:3 146:23	calculates	18:8,23 19:1,3
170:12,19	155:13,13	147:1 148:2,7	121:25 154:6	19:20 20:6,9
173:2 183:4	157:8 162:16	148:18 149:3	calculating 79:2	20:12,14,20,24
186:8,9 190:21	164:9	150:12,15,20	79:13 80:20	21:4 23:9 26:1
191:1,8,15	boys 163:13,14	150:22,23,25	85:3,6 88:24	26:8,10,14,19
193:21 194:19	163:17	150:25 151:3,4	89:5 104:20	38:16 66:21
194:22 195:1,7	branches 161:18	151:9,9,14	105:5,10 109:8	67:2 68:18,21
195:16 204:4	break 5:7 59:20	154:19 155:5	109:24 113:8	69:15,24 70:1
204:10 211:23	74:13,13,14	158:11,22,25	113:13 123:25	70:5,19,22
212:1,15,19	76:21,24 77:3	164:20 174:4,6	128:2 129:3	71:7,14,22
221:12,18,22	114:2 127:8	174:8 176:18	calculation 63:5	72:5,16 73:9
blot 181:22	166:10 203:14	177:1,3,5,8,11	63:18 64:4,13	73:14 74:2,22
blue 156:21	217:14 227:15	192:14 207:6	65:1 89:23	75:11,13,20,23
157:1,6,16,19	breaks 5:9	207:11,13,15	95:7 97:7	76:5 117:2,3
169:19 171:6,7	bring 6:6 79:10	207:21 208:2	104:24 106:23	134:17 147:16
171:11,12,15	122:10 140:20	211:25 212:5	111:14 121:20	147:17 206:6
171:16,17,17	177:1,11	212:16,19,21	calculations	212:4 213:5
171:20,24	bringing 171:10		55:16 60:12	217:21 230:1,7
172:1,3,5	brings 24:16		91:3 97:13	231:1
173:11,12,14	broad 142:3	C	100:8 104:25	Carolina's 26:4
173:16 174:2	broken 66:16	C 134:13 160:17	call 12:25 15:11	26:7 67:10
175:9 181:20	brought 42:17	160:20 161:6	22:21 26:11	carry 41:15 44:4
181:22 182:18	77:25	162:22 163:4,6	82:23 157:23	carrying 18:11
182:22 184:11	BTDs 169:16	163:10 164:13	179:4 195:5	Carter 31:6
191:7 200:25	Budget 72:6,17	164:16 165:14	called 42:3	case 1:2 7:13,23
201:3,4	74:22 75:11	165:17,19,22	91:12 137:13	9:24 10:15
board 1:7 109:2	bunch 190:11	165:24 166:3	185:19 217:20	11:8,21,25
109:8,25	207:25	167:1 210:24	calls 24:25	12:5,9,13
110:20 230:7	Burch 12:5	211:5,14	188:21	13:17,18 15:5
body 23:2	Burch's 12:13	C/user/Sean	cancel 186:6	15:8,11,13
		82:3		

16:20 17:1,9	216:11 218:5	181:24 182:17	96:9 190:7	106:11 180:11
18:19 19:7,10	220:17	182:21 186:7,9	214:25 215:11	chosen 196:14
19:13,16 22:24	catch 62:24	192:14,15,18	222:15 223:3	chunk 141:7
25:13 26:18,22	categories 89:17	193:15,15	changes 119:11	143:19,23
27:6,23 28:3,6	89:18,21,22	194:19,22,25	119:11 180:20	circle 143:20
28:23 30:8,16	207:22,22	195:7,12,13,15	194:1	201:24
30:18 31:18	category 63:21	204:4,10	changing 199:19	Circuit 145:24
32:21,25 33:7	65:10	211:23 218:9	Chapman 31:7	circumstances
34:2 37:19	Cause 27:3	218:15,16,25	chapter 21:19	53:7,19 216:3
38:5 39:8 42:3	caused 86:13	219:4,24 221:9	79:14,24	citation 20:22
42:11 44:7	90:18,23	221:12,18,20	105:17 109:13	106:8,10,14,17
45:4,6,18 46:8	causing 191:21	221:21,22	124:9	107:3 110:2,21
55:3,9,22	192:9	222:8,12,12	chapters 20:9	128:6
56:17 57:23	caveat 118:13	223:1,17	21:18	cite 134:21
58:19 60:11,17	130:20 171:13	Censuses 222:13	characterizati...	219:22
61:3,9 62:20	Census 19:3	center 2:10	47:7 52:15	cited 199:15
70:8 78:20	27:10 33:19,23	140:7 142:23	charge 208:12	220:13
79:9 81:24	34:1 35:7,16	143:1	chat 79:18	citing 48:9
82:10 86:18	37:5 38:8	centroid 143:23	204:11	220:23
87:10 94:16	61:25 62:6	certain 131:24	check 63:12,12	citizen 24:5
116:18 126:23	63:10,21 64:18	160:8 170:17	76:8 78:11	33:10 34:22,24
135:22 137:13	65:15 66:16,20	210:9,10 215:4	84:11 91:24	35:10 43:16
137:14,16	66:20 67:1,5,6	certainly 7:18	92:3,9 93:1	44:25 65:13,21
138:17 139:9	67:7,9,10,11	12:16 26:14	94:5 95:7,18	citizens 35:2,3,8
139:13 145:2	67:24 68:7,9,9	28:1,23 29:11	95:20,24	63:6 64:19
145:12,16,24	68:14,14,20,21	29:14 30:13	checked 63:15	65:6,11,16,24
146:1 159:9	68:24 69:8,16	49:7 83:23	92:18 95:2	80:6,7 85:15
169:3,9 179:20	69:23 70:10	84:17 89:8	96:1,13 99:15	87:15 121:6
180:6,12 185:5	71:7 72:7	91:1 95:16	checking 96:5	169:19 175:2,9
188:24 196:4,5	74:10 75:17	117:15 129:7	choice 51:3	175:10,15
199:11 205:19	77:7 78:11,12	147:18 158:22	183:21 184:3	citizenship 34:1
205:25 206:4	78:13 104:14	certainty 153:25	214:14,23	35:6
208:21 215:15	104:19 105:15	certified 1:12	216:3,18,22	city 8:12,14 9:17
217:20,23	106:18 108:21	58:23 231:3,13	224:4,10	9:19 31:11,11
218:1 225:11	109:8,10,12,17	certify 230:10	choices 53:2	137:19 147:15
230:2	109:20,23	231:3,6,8	choose 183:23	153:3 155:3,14
cases 15:10,25	110:2,19	cetera 82:4,25	200:15,19	155:18,21
16:8,21,21	111:13,16	103:14 222:22	choosing 184:14	156:3,5,9,10
17:3 26:9 27:1	112:10,21	challenge 58:17	choropleth	156:12,13
27:21 28:5	113:5,22 121:2	challenged	145:6,9,13,25	157:2 158:15
29:14 31:1,3	121:3,11	152:10	146:6,12,17	158:18 166:6
38:4 40:14	123:25 127:4	chance 149:20	148:21 150:6	173:10 192:11
44:16 59:10,15	129:3 130:8,8	188:13	151:17,22,23	Civic 2:10
60:22 62:10,11	130:16 148:1,6	change 76:20	156:1 170:20	claim 16:5 17:8
63:1,1 143:11	148:14,17	83:11 84:18	173:2,4 176:10	29:19 103:12
145:9 169:2	164:2 165:11	90:15 107:7	176:14 178:8	116:4 117:5
178:22 184:21	165:17 169:12	118:20,21	181:18	133:6 161:23
184:25 185:1,4	170:1,9,23	119:10 125:22	choropleths	claims 13:21,22
199:13,17	180:25 181:4,5	170:4 193:18	152:4	13:24 16:4,10
213:6 214:17	181:8,10,20,22	changed 95:11	chose 103:17	29:12

clarifies 211:9	210:13,14	Columbus 2:10	179:3	31:23 53:8
clarify 62:24	211:4 212:9,10	combination	compactness	92:7 122:10,12
108:9 149:21	212:13	85:17	53:3,14 135:22	171:6 174:19
175:3	coded 84:10	combine 86:7	139:1 140:4	208:25
class 25:15,17	171:17 218:20	105:23 106:3	141:1,7 142:6	concatenate
classes 163:13	coding 112:18	110:11,12	142:14 143:14	210:25
classic 131:19	210:3,4,6	combined 87:14	143:16 144:13	concede 178:7
clear 39:22 40:3	cold 113:25	104:24	144:14,18	concentrated
144:8 162:15	114:8	combining	159:10,19	137:19
189:3 193:12	collaborate	103:18 106:24	180:17	concentration
199:21	17:21	111:3,4,7,8,12	comparative	180:14
clearer 141:22	collateral 45:18	112:6,15 113:2	203:7	concerned
142:16 144:25	57:16	113:20	compare 189:12	180:17
clearly 40:1	colleagues	come 29:24 41:6	192:23	concerns 45:16
client 153:19	225:13	70:10 77:18	compared 34:21	47:10,18,24
close 127:19	collection 36:23	116:5,7 129:10	34:22 141:12	48:17 50:5,16
closely 85:19	37:13,14 38:2	185:2 190:6	comparing	221:5
88:2,5 96:14	40:8 165:7,11	198:2 210:18	176:18 195:2	conclude 91:4
153:9,18	Collingwood	225:23 228:18	competitive	134:7 162:20
cluster 22:5	5:15 69:4,7	comes 28:6	26:11	concluded 30:11
clustered 186:23	84:19,23 85:18	45:15 78:25	competitiveness	163:6 229:8
187:7,9,22	86:17 87:17	158:15 189:16	17:22	concluding
188:15 202:23	96:2 98:13	comfortable	complain 173:6	155:9,10
203:1	103:22 107:23	59:2 109:23	173:19 199:3	conclusion 25:1
clusters 157:7	108:14,18	coming 116:21	complete 5:5	29:25 30:5,14
157:22 208:23	109:4 110:4	178:20	231:7	30:19 83:11
co-wrote 36:6	112:5 113:1,16	command 172:1	completely	90:10 94:3
coalition 62:17	114:25 116:3	188:10	18:24 60:3	95:11 100:22
62:20 63:1	117:6 127:11	comment 60:11	188:2,12	102:17 103:12
coalitions 26:13	128:19 191:23	common 27:3	complicated	123:10 127:24
Coca 31:11	196:24 202:6	40:13 130:10	120:7 121:8	128:14 133:9
code 13:8 14:9	Collingwood's	208:2	complies 14:19	139:25 167:17
14:14 22:16	5:19 12:21	commonly	17:20 36:8	188:9 212:14
31:18,21 66:25	13:5,7 86:1,3	207:10	43:2 75:8	216:7
67:2 69:7	86:10 90:10	communities	80:11 82:17	conclusions
71:19 74:5,7	93:24 94:16,21	25:6,8 26:1	86:24 88:17	78:17 84:18
78:8,12 81:14	95:22 96:7	33:20,24 47:12	94:19 96:20	151:20,25
81:23 82:13	106:20 107:4	51:2,3,6 52:25	99:4 100:12	152:3 224:11
83:1,6,17 84:9	107:12,17	223:21	107:14 114:11	224:16 226:6
88:23 89:3,4,9	110:3 121:22	Community	117:22 135:1,6	conclusively
91:11 92:21	127:14 128:14	36:23 40:15	140:16 154:17	123:16
93:24 94:22,25	202:3,20	79:14,25	158:8 160:15	concrete 131:5
96:3,4,16	color 148:1,6,9	126:13 223:19	162:2 171:4	conduct 165:2
97:17 154:1,5	148:25 149:2	compact 29:1	186:16 202:5	168:7
161:25 171:23	150:10,12	47:14 135:11	206:8 209:5	conducted 168:4
174:14,20	151:5 171:9,12	135:11,16,17	211:21 221:3	168:5
192:3,17,17,18	171:17,19	140:8 142:11	components	confer 225:12
198:18,20	178:24 197:3	142:25 143:2,5	87:6	227:15 228:14
208:22,25	coloring 150:5	143:13,18,22	comps 132:10	confess 160:7
209:14,17,20	colors 180:4	143:24 178:6,8	computer 6:11	confidence 58:9

71:11 74:1	consistent 78:13	147:13	125:19 127:2	count 35:1,7
76:3 101:3,16	86:17 106:18	contributors	129:6 134:12	62:6,19 87:14
101:24 102:14	113:14 163:22	146:17	134:22,23	118:17,18
103:6 132:1,6	consisting	controversial	135:2,12,18	124:10,13
132:13,18,24	230:10	74:9	136:1,10,22	173:1
133:1,6,11,17	console 212:23	convergence	138:20 139:13	counted 62:5
134:2 223:14	consolidated	190:24	139:23 144:5	63:14,20 64:25
223:16	15:13 218:5	conversations	144:13 148:2	counteracts
confident	constant 215:8	224:7,19,23	151:4,9,10	118:21
190:14	constitute	Cooper 44:18	152:21 156:6	counties 7:11,16
configuration	138:14	copy 6:8 14:22	159:11 160:17	9:6,10 22:2,9
137:7	constituted	24:12 81:23	162:22 164:17	66:16 74:12
configurations	137:22	94:13,15 98:23	164:22 165:12	104:9 106:24
32:24 33:7	constrained	140:19 175:11	165:13 169:13	113:4 115:8,15
configure 136:5	189:9	copyright	176:20,23	115:18,19
136:12	consulting 29:6	146:16	177:2,11,20	116:23 117:16
configured	contain 132:3	correct 7:1	181:24,25	128:3 137:1,10
136:1,10	contained 71:14	12:13 17:16,23	182:23 186:18	138:19,25
168:13	74:2 91:4,9,20	18:21 24:3	194:3 204:5	139:7,11,16
confirm 99:15	92:1,19 105:2	29:22 35:3	205:20 207:6	140:9 141:14
confirmation	164:13	37:8 39:4	215:1 217:8	169:16 210:10
163:24	containing	40:18 42:23	221:9 223:17	210:23,25
confusing	114:19 115:4	43:18 44:1,10	226:1 227:4,19	211:6,14,23
200:23	115:12 144:19	44:18 48:11	227:20,23	213:4,16,17,18
confusion	contains 66:19	50:1 54:21	228:3,4 230:11	213:24 214:1,5
144:11 203:12	71:22 75:23	55:1,17 56:7	231:6	counting 104:20
congressional	76:4 82:13	56:12 57:2	corrected	country 11:10
15:14 20:14	156:5,8 164:6	58:24 60:13	195:11	18:14,21 19:5
30:9 218:2	Contemporary	62:2,3,21	correction 97:2	20:24
cons 199:14	21:8	63:19 65:1,17	correctly 15:5	county 7:19,22
consequence	contending	66:2,22 75:24	36:15 54:6	8:2,12,16,19
36:24	28:12,18	75:25 77:18	69:5 81:14	8:25 9:2,19
conservative	content 85:25	79:4,15 80:3	97:24 137:3	15:18,19,20,23
117:20	contested 29:12	80:16,23,25	139:22 172:10	16:1,4,16,20
consider 24:14	context 20:5	81:3,7,13	209:1 211:7	17:2 22:11
25:25 26:3	45:5 51:8	83:13 84:4	correspond	30:16 47:6,11
27:9 48:18	120:5 141:20	85:9 87:20	89:17,21	73:14 104:2,6
53:1,20 161:15	141:22,24,24	89:13,15 91:6	207:22	104:12,15,19
175:6	142:3,14,19	91:7 94:6 97:7	counsel 4:24 5:1	104:25 105:2
considerable	144:7,13 214:8	97:8,12 98:5	5:13 11:19,23	105:24 106:3
25:14	215:19	99:20 100:2,19	13:11 25:21	108:21,23
consideration	contiguity 212:2	101:5 102:15	43:19,22 44:5	110:13 111:14
47:19 63:23	contiguous	102:16 103:7	44:22 50:3	111:17,25
considerations	47:14	103:11,17,21	77:3,9,12,23	112:3,7,10,17
47:4 51:16	continues 82:22	104:2,9,16,17	78:2 93:20	112:25 113:19
52:9 53:14,15	88:21	104:22 105:3	114:7 145:4	114:13 115:12
155:2	continuity 159:7	108:23 110:8	224:7,15,19,24	115:20,23
considered 47:5	contours 155:4	111:5,9,10,18	226:18,22	116:1 118:23
105:5 108:25	contribute 147:5	111:19,22,23	227:6 228:12	120:19,20
152:14	contributed	113:5 122:4	231:9	121:16 122:1

123:11 125:9 136:24 138:7,9 138:12,16,23 138:24,25 139:3,19,21 140:23 141:4 141:10,16,18 142:10,20,22 143:3,6 144:1 153:2,8,16 154:12,13,13 154:14,14,18 154:23 156:11 157:20 158:16 160:3,23 161:2 161:3,5,11 162:4,11,21 163:8 164:16 164:22 166:22 167:2 202:19 209:17,21,24 211:4 213:15 213:15 231:2 County's 155:17 155:20 163:2,9 164:12 couple 22:23 120:23 173:8 207:7 course 20:14 39:10 57:3 157:4 183:4 courses 203:25 court 1:1 27:19 42:11 43:25 44:8,24 45:8 50:21 51:10,21 52:4,16 53:8 54:19 55:6,9 55:14 57:13,25 74:10 78:20 95:17 145:7,8 145:12,16 146:5 152:10 152:13 162:13 167:20 168:3 199:22 213:5 230:1 Court's 51:18 courts 27:24	146:3,9 152:9 199:17 Courts' 52:17 cover 21:1,4 covering 184:11 Covid 36:24 Covington 26:23 craft 49:16 create 14:4 46:25 69:7 151:19,23 152:5 168:23 172:6 176:13 187:3 created 80:6 147:13 151:24 152:5 creates 68:8 212:17 creating 28:13 28:19 202:13 213:4 credit 27:25 criteria 51:4 134:18,21 135:2,7 159:19 criticism 152:14 criticisms 197:23 criticized 59:11 59:21 cross 26:16 134:15 crosses 102:22 crossover 214:8 217:3,7 crucial 26:14 27:14 150:15 150:20 crunching 14:7 CSV 212:11 cumbersome 22:18 cumulative 212:17 cured 41:5 curious 78:24 88:3 107:3 128:5 current 14:22	218:1 currently 6:14 17:15 225:5 customizable 182:16 cut 52:3 76:17 216:20 CV 14:20,23 16:22 17:4 23:17 31:2,4 59:7,10 CVAP 18:23,25 19:2 33:10,13 33:18,22 34:5 34:15,19 36:12 36:20 37:6,9 40:14 41:11 44:1,9,13 45:2 45:4,9,17,19 50:14 51:14 55:16 56:11,19 56:20,25,25 59:13,23 60:1 60:8,12,20 61:11,16,18,20 61:24 63:5,17 64:4,17 65:1,4 65:14,23 79:3 79:8 80:2,17 80:24,24 81:2 81:2,6,10 82:25 83:2,7,9 83:13,13,23,25 84:3 85:6,8,11 86:6 87:22,23 88:11,25 89:1 89:6,7,15,19 89:23 96:24 97:4,9,9 99:8,9 99:25 100:15 101:1,7,11,18 101:21 102:1,5 103:2,12 108:23 111:18 111:18,21,24 112:2,9,16 114:18 119:19 119:20 120:5 121:12,25 122:9,16,19,22	122:24 123:18 124:15,21,25 125:2,5,9,11 129:4,21,24 173:23,23 174:8 175:12 175:18,22 186:18,21 189:17 206:14 207:5,11,18,23 CVAP_black_... 89:10 CVAP_black_... 89:12 CVAP_block_... 88:20 <hr/> D D 1:3 3:1 91:5 92:2 94:1 97:11,18 101:12 103:20 104:8,11,22 134:11 230:3 D-1 96:25 97:4 97:22 98:5 99:10 100:1,16 D.C 2:3 D1 83:4 D1_CVAP 82:21 82:24 Dare 7:18,19,21 dark 171:6 data 13:8 14:6 18:14 19:3,8 22:5 24:6 27:10,17 33:10 33:10,13,18,19 33:22,23 34:9 35:16,16 36:23 37:2,6,10,18 37:25 38:2,8,9 40:7,14,20,24 40:25 41:10,11 44:13 45:17,19 51:25 52:8,22 54:5,5,8,14,16 54:20 55:20,20 56:15,19,20,25 57:13,17,17,18	57:22 58:2,3 58:22 59:13,23 64:6,16 67:7 69:3,4 70:9,12 70:13 71:18 76:8 97:25 98:1,2,4,9,9 100:1 101:1,18 102:1,7,23 106:3,4 108:12 109:17,23 110:2,19 113:22 118:17 118:18 121:4,5 122:1,1 123:21 123:22 124:10 124:13 127:14 127:23 132:19 146:25 147:1 148:22 150:14 150:23 152:15 161:24 183:17 183:18,22 184:11,14 188:11,21 192:14,18 197:23 206:14 207:1,6,6,11 207:11,11,12 207:13,14,15 207:18,21,23 208:2,6,8 212:16 218:9,9 218:11,14 219:5,24 220:1 221:5,6,12,17 221:17,21,22 221:25 222:3,4 222:8,12,16 223:1,4,6,7,8 223:10,17,20 223:22 date 36:22 146:3 222:17 dates 137:12 Dave's 32:8,10 32:13 day 85:23 86:16 88:7 107:7 194:12 230:15
---	---	--	--	--

deal 101:20	128:23	176:7 209:10	198:4	150:24 151:12
150:14	degree 6:24 7:6	209:25 223:25	deponent 3:2 4:2	171:11
dealing 201:23	133:1 215:4	224:2,5,11,16	deposed 4:14	differences
201:25	degrees 215:7	224:20 225:19	15:4,6	92:13 150:14
debate 161:20	delete 138:18	226:6,11,16,25	deposition 1:11	different 25:8
161:22	democratic	227:2,7,19,22	3:5 4:17 5:12	41:4 46:20
decade 20:15	47:17 48:6,15	227:25 228:8	5:23 6:1,4,7	60:3 76:20
21:5 26:10,24	49:1	228:12	10:11 12:3,6	84:21 98:6
27:15	demographic	denominator	35:20 41:22	105:14 109:23
decades 222:5,7	18:13,20 19:5	63:7,17 64:9	46:1 57:9	111:5,8,12
222:17,25	demonstrate	64:10,14 119:6	67:18 72:10	118:15 119:17
223:8	191:20	120:8 121:6,19	74:17 77:2,15	120:24 138:22
deceiving	demonstrated	125:21 126:3,7	77:16 79:19	147:22 161:12
191:19	96:2	density 128:24	81:18 94:9	164:1 169:15
December 9:24	demonstrates	145:5,8,13,25	95:13,19,20	171:15,21
35:24	114:25 140:22	146:6 155:7	98:20 145:2	173:8 180:4
decennial 121:1	demonstration	158:20 168:19	149:16 158:13	187:25 188:2
121:3,11	7:12,22,25	168:23 169:2,8	166:15 174:21	188:12 190:14
192:15 193:14	17:13 25:18	169:12,18	175:6,21	190:16 191:23
218:15 221:9	29:2 32:15	170:5 173:22	179:11 204:13	191:25 192:2,4
223:17	79:4 83:3,3,18	174:8 175:13	219:12 229:8	192:21,25
decide 148:23	84:3 91:5,9	175:17 176:1,6	230:10,11	194:3,3,8,9
168:15 170:1	92:1,19 94:1	176:16 177:19	231:4,6	195:4 197:5
216:13	94:23 95:1,4	177:23 178:3	depositions	198:5,12,14,17
decided 106:17	97:10,18	180:1,22	225:7	199:4 208:1,7
declined 27:25	101:11 103:18	184:24 185:1	depth 49:23	215:6,7 221:6
decreases	103:20 104:8	187:3,7 188:2	describe 21:17	226:17
185:23	104:21 105:1	188:17 193:3	21:19 65:10	differential
dedicated	114:14 116:12	194:13 196:1	150:19 206:13	218:19 219:1,8
144:21	126:12,14,25	199:13,19,22	207:5 208:20	differently
deeply 27:6	127:2 134:10	200:4 201:16	described 66:1	172:4 181:3
default 211:11	134:13,25	204:21,24	75:5 134:11	201:20
defendant 29:17	135:5,10,16,25	205:10,18,24	213:4	difficult 173:1
defendants 1:8	136:9,15,19,22	217:19	describing 153:6	197:4 223:12
2:12 29:22	137:25 140:24	depart 53:3	description	dig 90:15 153:20
42:18 44:16	141:5 144:3	depend 53:19	206:19	154:4
143:12,15	151:20,22,24	63:9	designed 199:10	digging 107:10
230:8	152:1,18	dependent	designs 156:16	diluted 42:12
defendants'	154:24 155:12	103:14	determine 50:5	direct 152:3
90:18,22	156:16,18,22	Depending	91:8 126:24	166:21
defense 29:19	156:23 157:3	126:19	162:10 163:21	direction 113:19
defer 51:5 160:9	157:17,18,25	depends 63:24	185:16 198:25	186:9,10
define 7:24 25:8	159:5,11 160:2	65:9 164:9	determining	195:12,21
153:25 161:1	160:16,20	177:3 226:7	51:15 52:8	211:20
defined 61:25	161:6 162:22	depict 195:18	211:4	directive 51:10
161:9 210:23	163:3,6,10	depicted 172:9	development	directly 12:16
defining 161:4	164:13,21	195:23 203:13	20:23	29:11 37:20
definitely 106:8	165:4,14,17,18	depicting 182:18	deviation 128:25	104:14,19
125:24 174:4	165:22,23	197:23	Dickson 26:23	108:21 111:16
definition	166:2 167:1	depiction 186:6	difference 78:1	111:20 112:21

113:4 231:9	73:12,24 75:16	50:14 51:23	166:3,22 167:1	135:12 136:1
disaggregate	82:2,12 94:3,4	52:1,9 54:4	167:3,4 169:13	137:15,22,23
41:3,11 56:10	95:2,3,5	55:15,15 61:11	170:8,9,14,15	144:4,5 164:2
208:8	100:21 112:12	62:18 65:11,12	176:7,24 177:2	166:19 167:21
disaggregated	127:13 135:9	65:19 83:3,3	177:3,5,9,11	169:5 206:20
40:15 97:25	135:14,15,20	84:4 92:23	177:24 187:18	206:24 213:11
98:1,4 189:25	135:20 168:22	93:14,15,16	187:20,21,24	213:15 216:11
disaggregating	206:23 213:11	95:15 96:8,18	188:5 193:2	218:3
41:6 56:19	220:9	96:25 97:4,21	194:10,11	divide 177:24
206:14	disputing 90:10	98:5,8 99:9,10	209:10,25	divided 67:10
disaggregation	110:5 127:24	100:1,16 101:8	212:1,3,4,20	71:9 80:22
56:10 206:14	128:14	101:12,22	212:22 214:8	dividing 80:6
219:3 223:12	disruptive 128:4	102:6 103:13	214:10,11,12	DIVISION 1:2
disagree 109:3	dissertation	114:15 116:6,8	214:19,22,25	230:2
193:7 195:5,24	21:7,14,18	116:12,17	215:11,19	divisions 162:15
disagreement	23:8 25:7	117:24,25	216:1,8,8,14	document 10:14
143:11	27:17	118:2 119:1	217:2,3,6,7	35:19 36:1,1
disappear 22:25	distance 185:23	120:12,13,15	224:1,2,5,12	53:22 87:25
disappeared	distinguish	125:15 126:12	224:16,21	103:10 219:18
23:1	142:8 151:2,8	126:15 134:13	225:19 226:6	219:22 220:5,6
disappears 23:7	distributed	134:25 135:10	226:11,16,25	220:12,13,18
discipline 25:3	130:3,7,9	136:16,19,22	227:2,7 228:1	220:21 221:2
disclaim 18:24	186:11,22	136:25 137:2	228:9,13 230:1	221:11
disclaimer 37:3	187:14,23	137:10,25	230:1	documents 5:25
37:13 38:1,6	188:5 190:1,3	138:11,16	district's 36:14	6:6,10 13:11
disclose 15:3	distributes	139:5 140:24	61:16	13:14
disclosed 226:1	186:1	141:5,8,11	districts 7:12,22	Dodge 31:11
disclosure	distribution	142:11 143:13	7:25 15:14,14	doing 30:12 33:1
221:13	128:22 129:5	143:14,17,18	15:15 16:13	33:4 41:1
discourse 52:14	129:12 131:7	143:23 151:14	17:13,14 25:18	48:13 59:2
discrepancy	137:17 139:7	151:21,22,24	25:19 26:25	62:17 96:23
77:6 78:24	141:25 142:20	152:1,18 153:1	28:24 29:2	109:19 118:17
discuss 23:8,21	143:5 169:4	153:19 154:3,9	30:9,15,23	121:1 163:25
77:2,5,17,22	176:17 178:4	154:9,19,24	32:16,21 35:8	198:8,11
136:21 152:18	178:13 185:18	155:6,12 156:3	42:21 43:25	199:18
discussed 49:15	185:20 186:17	156:5,8,12,16	44:17,25 45:2	dollars 223:20
77:19 90:18	187:13 189:11	156:18,22,23	45:14,21 47:14	door 191:11
discussing 16:23	192:6,8 193:1	157:3,9,17,17	49:2 52:19	dot 128:11,13,18
43:4,10 89:18	193:8 194:9	157:18,25	56:6 58:10,15	145:5,8,13,25
89:22 160:16	203:8,10	158:12,15,24	58:17 79:4	146:6 155:7
160:19 199:14	district 1:1,1	159:5,11,14,18	83:18 84:20	157:5,11
Discussion	16:17 28:14,14	159:21 160:3,5	91:5,10 92:1	158:20 168:19
10:18	28:20,20 29:7	160:16,20,22	92:19 93:2	168:23 169:1,8
discussions	30:20 32:24	161:2,6,10,19	94:1,23 95:1,4	169:12,18,19
144:7	33:6,15 36:12	162:10,22,25	97:10,18	169:21 170:2,4
dislike 158:5	42:4,22 43:5	163:4,6,10	103:18,20,24	170:5,7 171:23
dispersed	43:11,14,16	164:6,9,13,16	104:8,8,11,22	172:7,7 173:7
196:23	45:8 46:11,15	164:21 165:4	105:1 114:14	173:9,22 174:2
dispute 16:14	46:16,25 47:9	165:14,17,19	126:25 127:2	174:8 175:9,12
68:1 72:18	47:16 48:15	165:22,24	134:10,14	175:17 176:1,6

176:16 177:19	downloaded	drawing 8:1	eastern 1:1,2	231:8
177:23 178:3	67:5 70:9	43:14 47:13	139:18 141:15	empty 150:1,9
178:20,24	downsides	50:16 159:10	230:1,2	180:13
180:1,22	148:22	160:5 178:10	easy 191:20	enable 21:20
181:13,15,15	Dr 4:7 5:15,19	201:18	ecological 16:14	175:23
181:20 182:3,5	5:22 10:25	drawn 25:18,19	16:17	enacted 135:11
182:6,14,18,22	11:3 12:5,13	29:2 47:25	Edgecombe 8:18	135:17 166:19
184:2,18,20,22	12:21 13:1,5,7	48:5 51:13	8:25 9:1 211:5	213:23 217:2,6
184:23,23,25	32:2,20 35:23	57:22 134:25	211:10,14,24	encountered
186:3 187:3,6	44:24 48:20	135:5,10,16	effect 23:3,7	60:7
188:1,17 190:3	50:11 58:6,14	137:10,15	29:12 84:24	ends 140:10
190:12,13,19	63:15 66:13	157:25 159:22	126:4 156:3	141:2,9
190:22,25	69:4,7 77:14	164:10 176:16	effectively 173:2	engage 106:23
191:1,7 192:24	77:22 84:19,23	201:6,7,8	effects 22:25	167:20
192:24 193:3	85:18 86:1,2,3	draws 192:6	23:1 126:9	engaged 31:4
194:13 195:3	86:10,17 87:17	drew 7:13,23	egregious	56:10 107:23
195:15 196:1,3	90:10 93:24	42:21 43:5,12	159:25 160:1	188:25
198:6,8,11	94:16,21 95:22	46:11 49:24	either 35:17	engagement
199:10,13,18	96:2,7 98:13	50:22 134:19	36:20 106:1,17	16:9,11
199:22 200:1,3	103:22 106:20	201:12 202:17	107:6 108:12	engagements
200:24 201:15	107:4,12,17,23	Drive 2:10	110:5 117:6	15:2 59:8
202:24 204:20	108:14,18	driving 9:2,8	140:5 181:17	entire 115:4
204:24 205:5	109:4 110:3,4	drop 142:23	193:4 199:19	126:17 137:17
205:10,13,18	112:5 113:1,16	166:8 204:11	216:20	157:20
205:24 217:19	114:25 116:3	dropping 140:23	elect 214:13	entirely 53:10
217:20	117:6 121:22	141:4	216:3	94:1 116:10
dots 157:14,16	127:11,14,21	due 221:4	elections 1:7	215:25
157:19 171:6,7	128:12,14,19	dug 78:23 154:1	16:15 21:22	entitled 21:7
171:7,14	128:20 169:3,9	Duke 6:25 7:6	22:1,23 23:20	77:14
172:20 173:11	184:22 191:23	duly 4:3 231:4	230:7	entity 28:12,13
180:8,22	193:11 195:25	Durham 7:3,9	electorate 36:14	28:18,19
181:11 192:14	196:24 197:16	dwarfed 90:22	electronic 229:2	enumerated
193:20 194:6	198:16 202:3,6		eliminate 118:11	222:4,17 223:7
196:9,12 197:1	202:20 205:1	E	118:19	Eprouty@bak...
197:4,10,10,20	205:11,18,24	E 3:1,4 136:16	Elisabeth 2:2	2:11
197:20 198:9	208:21,25	136:19 224:1,2	4:8	equal 151:12
198:12,17,21	209:14 211:3	224:5,12,16,21	Elisabeth.theo...	159:7 198:19
199:5,23	211:13 214:3	225:19 226:11	2:4	equals 82:25
200:10,25	217:17,19	226:16,25	Elizabeth 9:17	88:20 173:9
201:3,4,21	225:1,9,18	227:2,7,19,22	9:19 153:3	174:3 182:3,6
202:7 205:2,2	228:3,23	228:1,9,13	155:3,13,18,21	198:15
205:15,15	draw 32:20 33:6	earlier 12:2	156:3,5,9,10	equation 109:13
double 62:19	47:9,16 48:15	142:5 174:20	156:12,13	equipped 168:6
double-check	50:13 58:3	179:21 185:19	157:2 158:15	equivalency
74:4 93:3,9,10	146:14 151:20	192:5 210:13	158:18 173:10	92:5 93:21
double-checked	159:18 168:11	early 59:20	192:11	equivalent
95:13	209:19 213:10	127:18	employ 175:9	157:21
doubt 154:10	213:14	easier 92:14	employed 17:15	Erika 2:9 208:12
download 36:2	drawbacks 41:2	207:1	169:3	error 34:8 37:11
69:4,5	41:17	easily 182:15	employee 231:8	39:7,11 54:25

55:4,5,13,17	121:8,14,17,19	136:15,22	100:23	46:1 57:8,9
55:21,23,25	121:25 122:21	140:14 145:2	evaluated 42:20	59:5 66:5
56:3 57:19,21	122:24 123:7	154:4 206:11	evaluating 13:21	67:17,18 72:9
58:7,7,15 59:3	123:10,16,25	206:18	13:24 16:16	72:10 74:16,17
59:12,23,25	124:2,4,6,7,10	established	17:13	79:18,19 81:17
60:12,19 61:6	124:17,24	99:18 220:16	event 82:11	81:18 86:22
61:11,15 79:2	125:5,10,18,20	estimate 44:2,6	everybody 229:3	88:15 94:8,9
79:8,13 80:17	125:25 126:6	45:20,22 50:2	evidence 47:24	97:14,15 98:19
80:21 81:2,6	126:15,17,22	54:9,12,13,17	48:10 53:15,20	98:20 140:15
81:10 82:14	128:2 129:4,5	61:12,16 80:18	evidentiary 42:3	166:9,14,15
83:2,7,8,10,12	131:7,25 132:3	85:8,12 86:3,6	49:12	174:17 175:6
83:16,18,21,25	132:12 147:23	87:6 97:21	exact 48:24	179:5,7,10,11
84:2,8,13,15	175:25 176:3	101:8,21 102:5	201:24	204:12,13
84:23,25 85:3	182:9 183:24	113:20 120:3,6	exactly 8:11	219:11,12
85:6,8,21,22	186:8,10,18	122:17,19	41:15 145:17	exhibits 3:5
85:24 86:6,7	188:6,11,12	124:5,14 125:5	213:12 216:4	174:18
86:11,13,20	189:4,6,7,12	129:13,15,17	218:21	exist 134:5 157:7
87:5,13,18,19	189:16 190:13	129:21 130:18	Examination	190:5
87:21 88:2,6	191:9,12,21	131:6 132:11	3:3 4:5	existence 47:23
88:11,24 89:5	195:11,12,20	estimated 84:19	examine 169:4	exit 18:14 19:8
90:4,5,14,17	202:12 210:3,4	86:17 92:7	examined 4:3	expanding
90:18,21,22,23	210:6,14,21	96:7,24 97:3	example 15:1	118:19
91:2 96:3,4,7	errors 41:10,14	99:8,9 102:10	65:20 112:14	expect 191:4
96:12 97:6	83:14 96:6	102:18 103:12	113:10 146:12	expectation
101:19 102:2	107:22 108:1,4	119:20 120:6	151:1 184:16	130:19,22
103:14,18,19	108:11,14	121:7 123:5,6	194:22 207:2	131:12
103:23,25	112:19 186:21	estimates 39:3	218:19 221:16	expedited 229:6
104:2,5,6,15	187:9 188:4	44:11 45:20	examples 26:17	experience
104:18,21	189:14 190:1,3	55:1,6 56:5,9	28:24 30:7	25:14 133:23
105:5,10,23,24	190:5,8,16,18	58:4 61:18,20	183:5 184:25	134:9 150:12
106:23,24,25	190:22 191:2	64:18 65:5,14	exception 222:9	expert 9:13
107:9 108:8,20	191:17 203:18	65:22,23 71:4	223:2	10:14,20 11:20
108:22 109:5	especially 155:3	79:3,8 83:23	exclude 61:21	11:25 12:4
109:21,24	180:16	83:25 85:15	63:22 138:5	14:17 15:1,7
110:7,13	Esselstyn 5:15	86:1 120:9	excluded 27:19	16:18,22 17:3
111:14,17,20	5:17 7:13,23	130:9,22,24	27:22 47:19	18:19 19:4,7
111:21,25	10:25 11:3	131:4 186:18	126:11 159:3	19:10,13,16
112:3,8,9,16	92:4,21 93:21	186:21	164:20	24:14,18 25:25
112:22 113:3,4	97:20 98:16	estimating	excluding	26:3,18 27:9
113:8,9 114:18	99:7 100:7	113:22 117:18	128:13 155:5	27:12,18 28:2
114:20,21	135:1,6,10,16	131:3	177:22	28:11,17 29:2
115:2,3,7,10	148:4 153:10	estimation	excuse 65:19	29:6,13,21,25
115:12,22,24	153:18 159:3	113:15 117:19	exercise 74:8	33:15 37:7,14
115:25 116:10	196:24	et 1:7 82:3,25	exhibit 3:6,7,7,8	37:19 40:21
117:10,11	Esselstyn's	103:14 222:22	3:8,9,9,10,10	42:17 46:6
118:1,2,12,19	32:24 79:4	230:7	3:11,11,12,12	51:13,15 59:6
118:22,24,25	91:5 98:24	ethnicity 24:23	3:13,13,14	59:8,11,22
119:1,3,7,14	101:7,15 103:2	222:3,16 223:4	10:10,11 14:17	60:16 95:9
119:22,23,24	114:14 128:18	223:6	35:19,20 41:21	108:7,9 127:20
120:8,14,15,18	134:11 135:25	evaluate 13:22	41:22 45:25	216:7,16,25

217:11 225:2 225:10 226:8 expertise 25:11 26:6 27:13 167:16,23 experts 10:25 40:14 52:18 190:6,11 225:7 226:19,21 explain 21:24 70:11 142:13 149:13,17 171:14 173:8 explained 86:9 153:15 200:2 explaining 142:5 explains 87:4 214:3 explanation 130:13 explication 142:18 144:9 explored 22:22 exponentiated 129:1 expressing 12:12 extends 153:2 160:22 161:2 extensively 18:13 25:17 extent 24:17,21 24:25 25:1 77:24 157:7 224:6 226:15 exterior 162:17 extreme 183:6 extremes 143:2 143:25 186:5 eye 172:3 191:19 eyeball 51:24 92:12 162:14 168:4,7	fail 84:7 failed 34:1 59:25 failing 59:11,22 failure 103:16 132:9 fair 4:22 5:9 27:23,24 33:11 47:6 52:15 53:9 63:3 151:7 175:7 177:7 fairly 88:7 133:24 190:14 fall 148:19 falls 114:13 familiar 52:25 169:8 213:3 familiarity 147:17 familiarize 11:11 far 38:22 115:9 123:21 fashion 186:24 187:8 favor 85:21 86:13 87:19 88:6 90:14,18 90:22,23 favorite 173:17 Fayetteville 71:24 February 46:7 federal 18:15 fell 140:11 felt 59:2 fewer 126:12 fields 25:11 fight 27:23 208:7 fighting 61:4 figure 49:24 53:24 146:11 149:24 150:5 154:6 155:7 156:20 157:13 158:7 164:15 165:8 168:20 171:2,2,5 172:12 173:11	174:2 182:12 184:7 199:1 202:7,13,18,25 209:3,6,9,13 209:16,21 218:21 figured 109:7 208:6 figures 55:8 file 92:4,5 93:21 212:11 filed 9:15 46:7 59:17 179:20 220:10 files 92:15 filibuster 122:11 fill 143:20 150:9 filling 173:3,5 filter 210:24 final 78:16 102:8 117:18 financially 231:9 find 35:1 49:15 108:25 149:17 210:16 230:11 finding 23:3 133:19 158:2 fine 57:18 114:2 114:6 202:14 fire 96:10 firm 4:8 firmer 213:14 first 4:2,13 9:12 23:3 27:1 60:6 74:4 81:1 82:3 85:7 90:17 122:8,15,24 123:2 176:11 201:6,12 211:22 213:16 227:18 231:4 fit 65:10 95:24 five 182:5 195:16 five-minute 203:14 five-year 54:12 54:13,17 fleshed 215:25	flip 17:18 100:10 113:23 114:10 173:21 196:25 flipping 150:22 Florida 17:5 focus 102:21 141:13 181:19 184:6 focused 26:19 focuses 144:17 follow 40:2 62:23 159:14 167:22 217:18 229:7 following 192:13 follows 4:4 115:16 155:3 footnote 133:4 133:12,15 186:15 force 211:14,17 forced 56:1 forces 211:5 foregoing 230:10 231:6 form 82:5 161:19 224:4 formed 136:18 224:1 225:18 formula 80:13 80:16,20 81:5 81:11,15 84:8 85:5 87:1,4,12 87:21,25 88:2 88:9 90:11 96:12 103:17 110:7,13 117:19 119:3 120:7 121:8 124:1 126:6 129:8 forth 213:17 215:7 forthcoming 82:8 forward 77:20 found 22:25 42:11 49:2 107:10 foundation	170:12 four 56:18 57:1 163:13,14 fraction 124:3,6 frame 212:17 frequentism 131:19 185:22 front 24:12 froze 30:9 frozen 209:11 full 4:10 29:3 87:25 fully 30:11 200:7 200:16 function 91:12 91:14,17,25 119:15 128:24 fundamental 143:10 funding 215:7 further 13:17 47:15 66:16 86:14,16 222:4 222:16 223:7 231:6,8
<hr/>				
G				
<hr/>				
Galveston 30:16				
game 55:3 175:7				
Gate's 218:22				
Gates 153:8,16 154:13,14 161:13,14,17 161:20				
general 12:3 117:8 159:13 176:14 178:13 190:23 197:22 199:13 207:8 215:16,25				
generalizable 115:17				
generalization 38:17				
generalized 50:24 116:25				
generalizes 115:9				
generally 51:5 60:1 104:1,4				

118:11 119:1	178:13 186:6	58:19 60:21	greater 24:19	74:13 78:18
119:14 124:10	191:22 192:25	62:23 64:18	34:6,16 62:16	91:3,8,15,18
126:20 127:13	203:5 207:2,8	65:15 66:6	82:23 124:16	91:24 92:9,12
127:22 128:7	221:16	76:19 77:19	151:13,16	92:18,22 93:2
128:16 133:19	given 39:19,23	79:17 81:17	185:23,24	93:13,14,25
169:22 170:12	52:16 58:2	95:14 96:16	green 158:25	94:22 95:1,8
170:13,20	63:10 131:23	98:18,18 104:1	greenish 148:10	96:17,25 97:4
178:7 189:19	174:16,17	108:11,13	Grofman 36:6	97:10,17 98:4
194:17 215:14	175:5 187:21	110:16 113:19	groove 175:15	99:8,10 100:1
generate 192:12	230:11 231:7	113:24 125:14	ground 58:18	100:15 102:9
genuinely 78:24	gives 84:17	125:16 128:12	grounds 49:13	102:17 103:19
107:2	97:20 132:7	132:17,25	52:24	105:16 106:12
geocoding 171:1	178:17 193:6,7	134:1 142:5	group 29:1 41:7	106:25 107:1
geocodings	194:8 198:4	143:1 148:23	56:11 62:12	110:25 111:3,7
170:24	giving 200:24	148:24 156:11	70:19 71:14,21	112:6,15 113:3
geographic	go 8:24 9:2,8	156:12,13	72:25 73:14	114:19,21
111:4,8,12	26:15 28:22	157:4 158:16	74:2 95:15	115:4,9,11,13
170:13 183:11	29:9 33:3 35:5	166:8,13	103:25 104:4,5	115:23 116:11
185:9	37:16 38:25	170:15 176:2	104:25 105:16	117:25 118:23
geographically	39:6,18 40:11	177:1 179:2,6	105:24 106:4	120:13,18,20
111:1 170:22	46:23 48:2,22	179:9 183:4,5	110:8,11,12,12	121:15 122:5
186:23 187:7	49:10 50:19,25	184:15,21	113:13,21	123:11 124:16
geographies	51:1 52:12	185:14 186:9	115:2 119:17	126:24 128:3
69:12 74:10	53:18,21 54:23	186:11 187:13	119:25 122:2,8	187:19 189:10
geography 26:4	68:11 74:4	188:5 189:5,5	122:15,18,22	189:13,16,17
26:7,9 147:17	75:3 76:8,21	190:8,17,18	122:25 123:2,3	189:24
geometries 92:6	78:11 82:16	191:17 193:18	124:20,20	grow 118:12
germane 25:12	86:21,23 88:16	195:21,22	125:2,8,10	gubernatorial
gerrymanderi...	89:22 94:18	197:6 203:22	126:11,14,17	17:23
16:1	95:7,18 102:20	204:11 208:12	175:24 178:5,7	guess 7:24 10:4
getting 6:24 7:6	106:6 116:14	211:19 215:5	188:13,15	12:10 13:12,25
49:25 50:7	117:14 120:22	217:9 219:10	189:7 194:19	14:2 24:24
113:25 114:8	121:21 124:1	221:24 223:11	194:21 206:15	25:9 29:3,17
120:24 121:9	146:11 148:8	224:8 226:7,10	207:6 210:22	58:9 63:9,13
131:23 157:19	158:7 160:14	227:9,14	210:23,23	69:13 70:12
194:24 205:7	179:14,23	good 4:7 41:7	211:1 214:14	71:24 93:3
Gingles 29:4	208:13 217:14	66:8 76:20	216:1 218:23	128:10 138:5
30:1 31:4 44:3	222:2 223:25	127:7 149:20	grouped 209:24	138:10 147:23
45:16 57:6	goal 46:24 47:4	150:14 186:20	Grouping 209:7	149:4,16
58:11 60:3,9	47:8 49:25	188:13 189:8	groupings	157:23 158:6
60:16 143:12	50:6,13 176:6	194:24 195:2	113:20,21	158:10,13
178:6	176:12	229:3	209:10,18	172:4 179:3
girls 163:14,14	goes 88:11,25	gosh 109:15	210:7 211:5	195:4 196:6
163:18	89:6 221:16	government	213:4,15,16	220:2
give 5:5 22:12	going 10:9 14:12	28:12,13,18,19	groups 56:7,19	guidance 50:21
22:12 69:18	26:24 33:9	grad 133:24	62:13,16 66:20	51:18 52:16
78:21 131:2	35:18 40:2	gray 197:9,20	67:15 68:9,14	106:1 108:25
138:6 148:10	41:19,20 45:25	205:3	69:24 70:2,5	162:13
168:12 173:8	49:22 50:22	great 24:13	70:23,25 72:2	Guilford 166:22
175:3 177:23	55:22 57:7,7	184:16	72:20 73:9	167:11 231:2

H	187:17	18:6 218:2	illustrative	54:17,21 55:25
H 3:4	high 133:1 155:5	households	17:14	153:8 157:22
half 20:15 114:4	158:22 190:9	38:11,15,19,21	imagine 60:14	161:17 167:1
176:25 177:10	higher 24:18	40:9	96:16 163:12	including 4:17
Halifax 142:22	35:11 36:21	hub 40:21 41:11	201:18	38:1 47:12
Hall 27:5	37:1 38:10,14	56:15 98:2,9	impact 151:13	203:3 218:11
hand 231:10	38:19 47:16,23	208:6	151:16	219:25 225:7
handbook 79:14	48:5,15 53:13	huge 191:21	implement	inclusive 230:11
79:25 80:10	104:1,6 112:8	human 198:21	81:14 85:5	income 218:20
86:21 105:12	113:3 115:3,24	hundreds	implementation	218:22
105:17,22	117:11 125:10	170:18 183:4	76:13 210:19	inconsistent
109:14	129:13 132:22	191:15 194:25	implemented	123:9 132:20
handling 217:12	156:17 159:18	195:7	70:14 90:11	incorporates
happen 125:14	189:5	hung 120:24	implements	166:5
happened 28:1	highest 211:25	121:9	209:1	incorporating
223:10	212:16	hypothesis	implicit 108:8	128:17 155:4
happening	highlighted	132:22 164:3	important 44:21	incorporation
124:15	222:3 223:6	hypothetical	95:6 102:4	21:21
happens 126:19	highly 156:21	221:16	120:2 130:19	incorrect 83:22
happiest 197:25	157:6	I	171:12	95:17 97:19,19
happy 199:4	Hill 169:3	I-95 147:21	imposed 44:15	99:22 100:8,16
225:14	184:22 185:4	idea 50:24 67:25	impossible	100:22 102:3
hard 6:8 24:11	196:5 204:25	69:19 71:4	103:23 127:3	174:24 206:19
94:13 140:19	205:11,19,25	114:23 132:7	impression	incorrectly
Harris 44:19	Hillsborough	163:9 190:1	177:23	70:15 90:11
HCVAP 47:16	2:7	192:6	inaccurate	increase 122:12
47:23 48:6,15	Hispanic 43:16	identical 199:1	183:10 185:8	126:10 143:21
49:1,25 54:4	44:1,8,25 45:9	identically 199:2	185:13,14,17	increases 119:7
head 8:11 25:24	50:25 51:2,3,6	identification	196:21	increasing 84:24
29:16 50:23	61:22 62:5	10:12 35:21	inappropriate	independent
71:5,12 210:5	63:6,11,16	41:23 46:2	105:23 106:3	22:6,10 143:13
headache 34:2	64:3,7,25	57:10 67:19	include 16:3,18	Indian 62:2
hearing 42:3,9	65:14,21	72:11 74:18	18:20 19:4,8	63:11 85:17
49:12	178:20,23	79:20 81:19	19:10,13,16	indirectly 12:15
heart 185:22	179:2	94:10 98:21	48:7,9,17 49:4	12:18 231:9
heavily 162:16	Hobbs 42:4	166:16 179:12	49:5 54:25	individual 86:12
162:17,18	Hodges 17:7,12	204:14 219:13	56:4 57:20	104:4,5 115:2
202:23 203:1	Hold 35:25	identified 92:22	58:7 61:25	127:4 137:23
held 42:7 215:8	holidays 61:5	93:13 107:25	132:25 161:5	183:22 218:15
222:22	honestly 87:16	108:4,8 115:17	180:1 181:13	individuals
help 11:19,23	89:2 98:11	identify 31:3	181:15,17	187:11,12,12
74:10 140:25	145:14 153:23	57:1,24 59:10	included 7:12	individuals'
141:6 227:17	176:4	64:7 96:17	20:12 37:12	218:10 219:25
helpful 162:13	hope 208:15	107:22 138:13	63:7,17 64:3	inertia 137:14
175:7	Hostetler 2:9	145:11,15,19	93:25 126:14	139:13
Henderson 8:5,8	hour 1:13 76:19	identities 218:11	126:15 153:16	infer 117:8
8:10 166:6	76:21	218:15 219:25	157:18 158:22	inference 16:14
Hertford 140:23	hours 10:1 11:15	ignoring 144:16	158:24 165:3	16:17
141:10 143:6	house 15:14	illustrate 78:17	165:14	infinitely 202:2
heterogeneity	17:22,25 18:1		includes 37:7	inflated 116:5,7

116:10,15,21 inflates 113:8 information 66:19,24 183:19,22 184:14 226:13 informed 114:6 inherently 223:22 initial 134:11 153:11,13,22 179:16 injunction 9:14 9:23 10:2 11:25 60:10,17 60:20,25 61:8 INLA 22:21,23 input 109:20 inquiry 131:18 143:18 167:19 inside 187:21 insight 22:12 insisting 197:18 inspect 58:3 installation 72:3 instance 29:7 176:4 instances 23:24 30:4 215:15 instruct 77:10 224:8,15,17 227:10 instructed 168:3 226:10,24 227:11,18 instructing 105:13 226:23 227:1 instruction 110:1 175:4 227:16 instructions 52:17 226:18 226:22 228:17 instructs 5:1 integrated 21:20 intending 46:20 interacts 171:20 interdependen... 22:17	interest 25:7,9 26:1 47:12 52:25 180:2,7 interested 185:15 206:22 231:9 interesting 150:24 interior 162:18 interpose 24:25 interpret 26:16 intersect 91:12 91:15,18,25 93:12 intertwined 51:9 interval 132:1 132:13,25 introduce 215:3 introduced 219:1,8 introduces 156:9 introduction 184:13 invalid 223:23 invariant 222:8 222:22 223:1 inversely 118:1 118:24 119:23 119:24 120:14 120:19 121:14 121:17 123:10 123:14 125:18 125:20 126:1,8 invert 83:13 investigate 85:19 86:14,15 156:15 investigates 115:8 investigation 165:2 involve 18:3 26:25 involved 25:20 27:6 31:2 34:8 39:11 42:15 184:17 194:13 involves 188:21 206:5 218:2	involving 21:19 26:19 226:21 isolated 202:24 203:2 issue 62:12 87:17 98:12,15 116:25 172:8 172:16 173:13 173:18 176:4 183:23 188:16 200:14,18,22 201:3,11 216:25,25 issues 16:7 30:10 37:13 38:7 56:18 57:1,21 57:24 58:22 60:16 78:5 96:11,14 175:20 iterations 221:21	jurisdictions 49:10 50:10 52:2,23 justified 28:13 28:19	78:18 79:22 81:21 82:9,18 83:24 85:21 86:19 87:20 88:1 91:21,22 91:23 92:23 93:13,19 94:12 95:14 101:9,19 102:2 105:11 108:10 109:6 109:10,15 110:6,7,16,24 113:10,18,21 115:9,16 116:6 116:8,15,20,20 116:21,25 117:3,4,15,19 118:6,11,17 121:13 127:20 128:1,5 132:4 132:23 133:13 136:2,12 138:14 143:9 145:10,14,17 145:18,23,24 146:4,10 147:9 147:23 149:23 151:11 152:3 152:16 155:16 155:24 156:1 157:19 159:6 160:11 163:5 163:20 168:10 170:23,24,25 172:4,17,19 173:25 174:7 176:11 178:15 178:24 187:19 189:23 191:13 191:23 192:24 196:11 197:18 199:1,16 204:16 205:21 206:5 211:16 213:11 214:6 216:20,21 217:23 218:23 219:15 220:6 221:23 225:22 knowing 22:10
		J J 1:12 JADS 22:17 job 18:3,9 20:1 41:7 John 16:6 joint 23:18 Jordan 2:6 journal 19:24 21:12 journals 133:5 133:10,21 134:7 joys 158:13 judge 168:16 judgment 157:23 179:4 188:21 195:4 July 11:13 15:22 220:14 June 11:10 15:22 jurisdiction 49:19,20,21 52:2 65:20 jurisdictional 47:6,11 49:5	K Kaye 2:2 keep 113:14 146:2,9 keeping 106:17 107:1 159:6 kept 222:8 223:1 key 147:25 150:5 kid's 59:19 kind 74:9 78:17 78:20 107:3 113:11 128:5 143:10 157:9 158:16,17 164:3 172:20 173:3 181:16 183:21 184:1,2 185:21 192:6 197:3,22 203:4 kindergarten 163:13 know 5:8 8:7,10 8:16 9:4,11,19 11:18 12:14 14:14 16:5 18:22,24 22:4 22:9 24:18,19 26:2 27:11 28:23 29:10,14 30:3,8 33:4 35:7 37:1,2,20 38:13 41:25 46:4,17 48:12 50:15,22,23 53:20 56:3 57:19 60:22 61:1,6 62:22 63:20 67:21 68:6 70:8,8 71:21,25 72:13 73:21 74:16 76:2,11 77:6 77:14,24,25	

175:22	leaves 164:7	104:25 105:1	31:2,3 122:5	61:6 67:23
knowledge	leaving 205:17	105:16,24,25	122:15,18	72:15 73:8
23:25 24:3	led 49:12	106:4,4 108:22	124:20	75:10 88:2,5
58:25 146:5	Lee 30:18 31:9	109:8,20,25	listen 77:12	98:9 100:10
198:7,10	left 11:12 156:23	110:20 111:15	lists 94:21	107:24 108:2,5
known 112:3,8	162:24	111:17 112:7	209:17	108:10 117:21
189:11	legal 24:17,17	112:10 113:12	literal 187:25	118:22 124:19
Koonts 2:6	25:1 43:21	113:13,19	188:6 189:4	137:9 138:12
	44:4,22 58:11	122:1,2 147:19	190:8	139:2,6 149:5
L	136:5,7,12	175:22,24	literature 25:10	153:9 154:7
label 165:9	158:2 160:8	183:22 185:13	litigation 9:13	157:10 158:14
labeled 166:22	199:25 216:16	185:14,17	little 45:18 51:7	161:25 167:20
lack 22:4 49:11	216:24	192:15 206:3	51:19 58:21	170:20 171:7
215:4	legally 44:15	206:15,15	62:13 76:19	171:16,20
Lamone 30:8	legend 146:16	218:10,14	82:10 96:14	172:5 173:18
language 22:18	legislative 16:2	219:5,24 222:9	118:13 137:5	174:15,16
175:11	16:16 26:25	222:13,21	142:5,18 144:9	175:4,7 179:3
Laplace 21:20	42:12 134:19	223:2,11	144:25 157:8	192:7 196:23
large 72:2 165:7	185:5	levels 105:14	158:18 164:1	196:23 198:6
180:13 185:19	legislature 46:12	106:18 109:2	169:15 208:12	199:4 202:19
187:16	134:18	109:10,12,23	213:14	202:23 203:1,4
largely 154:20	lengthy 52:13	113:14 132:6	live 6:14 7:2	206:25 213:16
155:1,13 158:3	let's 14:16 17:18	Lewis 16:6	153:1 154:3,9	214:21 220:23
larger 91:1	31:17 46:23	lie 74:6 162:16	160:21 170:9	looked 32:8,10
115:7,10 118:3	53:21 59:5	lies 185:21 216:4	lived 6:17,19 7:4	32:15 43:6
120:16 124:17	66:3 68:11	life 40:3	7:8	60:4 87:7,9,17
196:8,12,22	80:9 82:16	light 171:7	lives 155:17,21	90:13 95:10
largest 71:14	86:21 94:18	likelihood	LLP 2:2	98:7 105:12
73:13 74:1	96:19 101:10	131:21,23	loaded 66:7	108:9,17,25
75:17,22	102:20 106:20	132:8,15	147:1	109:13 116:24
105:19	107:12,13	limit 165:5	located 71:23	125:25 135:13
late 45:18 55:3	108:19 113:23	limitations	147:22 195:8	135:19 140:9
57:16 58:21	114:10 124:1	41:17 64:15	locations 23:19	140:10 141:8
59:20	128:21 132:12	line 44:4 76:18	170:24	145:1 153:17
Latino 42:13	132:12 138:11	82:3,20 86:19	long 6:17 22:19	154:2 167:4
Latinos 36:11	138:21,23	88:20,23 95:10	39:21 43:7	174:20 196:7
law 4:8 6:24 7:6	140:13 146:11	131:18 162:10	196:6 220:7	220:6,12,12,18
185:19 187:16	157:13 158:7	170:8,9,15,16	226:5	225:22
lawyerly 144:15	160:14 162:1	178:9 202:2	long-standing	looking 18:22
lawyers 6:4	173:21 186:13	210:18	23:2	25:8 43:14
51:20 52:18	186:14 196:25	lined 101:8	longer 26:12	51:21 52:18
133:14 160:9	202:3 205:9	lines 43:15 83:17	154:3 184:23	86:22 89:10
176:11	209:3	89:2 101:15	208:13,18	100:3,25 107:3
lay 24:20	letter 31:25	159:14 177:24	look 7:14 8:3,6	128:10 137:17
layperson 168:7	letting 50:23	list 15:8 59:8	8:15,20,21	140:2,18 141:1
learn 34:4,14	level 16:2 26:12	179:14 210:25	12:25 32:12,13	155:25 156:20
35:10 164:11	26:13 40:16	212:17	51:25,25 52:3	162:3,15 166:2
learned 40:3	41:12 56:11,11	listed 15:2,8	52:8,21,22	167:2,10,13,17
leave 82:10	56:20,25,25	16:22 17:4	53:2 59:24	167:21 168:2
119:12 197:21	104:1,2,15,20	23:3,17 27:1	60:14,15,19	168:14 171:5

174:13,19	maintaining	mapping 209:19	112:3,9,16,22	94:8 98:19
198:21 212:23	139:19 141:16	maps 14:4 32:12	113:9 114:17	166:13 219:15
looks 73:13	majority 28:13	32:13 44:8	114:20 115:3,7	marked 3:5
75:15 81:25	28:19 33:15	47:18,23 48:18	115:10,12,22	10:11 14:17
82:6,6,12	46:14,16,19,21	49:4,5,13,15	115:24,25	35:20 41:22
85:20 87:7	46:25 47:9	57:22 134:19	116:10 117:11	46:1 57:9
91:15 93:24	58:10 104:7,21	136:8 146:12	118:2 119:1,3	67:18 72:10
115:15,18,19	114:13,16	147:8,14 148:4	119:7,23	74:17 79:19
158:3,9,21	134:14 137:2	148:21 150:6	120:15 121:19	81:18 94:9
168:14 173:8	150:22 165:12	150:11 151:18	121:25 122:21	97:14 98:20
173:19 190:13	176:8 177:3,8	151:22,23	122:24 123:6	140:15 166:15
199:6 202:16	177:25 214:11	152:2,7 156:1	124:2,4,6,10	175:5 179:9,11
204:24 212:21	214:11,12	168:19,24	124:24 125:5	204:13 219:12
220:19	making 36:13	169:2,18 170:5	125:10 126:15	markings 34:8
lose 183:19	131:18,19,22	170:20 171:15	126:16,22	37:11
184:15	Management	173:3,4 176:10	128:2 129:4,5	marks 64:24
losing 150:14	72:6,17 74:23	176:13,15,16	131:7,25	65:13
lot 30:22 34:20	75:12	178:9 180:1	132:12 176:3	Maryland 30:10
51:24 84:22	map 8:3,6,15,20	182:2,2 183:20	margins 54:25	mask 218:10,15
110:18 133:21	8:21,23 47:25	184:24 191:19	55:4,5,13,21	219:25
133:25 147:10	48:6 49:25	191:24 192:12	55:23 56:3	Massachusetts
172:20 175:20	50:16 51:13	192:23 193:3	57:19,21 58:7	2:3
176:12 180:16	52:22 53:12	194:13,25	58:7,15 59:12	massive 182:11
184:5,11,14	54:4 58:4 60:7	199:13 205:18	59:22 60:19	matching 105:14
188:20 202:23	91:16 92:11	211:5 213:24	61:6 79:2,8,13	109:9,12
lots 64:15	135:5,16,17	Maptitude	86:7,12 96:7	121:10
Louisiana 28:24	136:9 137:1	92:17 93:1	101:19 102:2	mathematical
love 128:5	144:4 146:14	March 42:7	103:19,25	106:2
low 190:9	146:17,17,20	49:12 59:20	104:1,18	matter 10:21
lower 36:21,24	146:20,21,22	margin 55:17,25	105:23,24	34:23 109:13
37:1 39:4	146:25 147:2,3	59:3,25 60:12	106:24,25	129:18,23
64:19 65:5,15	147:6,11,13,14	61:11,15 80:17	108:20 111:14	173:7 188:25
65:22,23	147:18 151:1	80:21 81:1,5	111:17,20	193:4 199:18
114:19 123:2,5	152:14 153:10	81:10 82:14	112:7 113:3,4	226:9
123:6 125:9,9	155:7 157:4,10	83:2,6,8,17,21	113:8 114:21	matters 61:2
125:12 126:16	157:14 158:9	83:25 84:2,8	115:1 117:10	143:16 207:4
126:21,22,25	158:20 164:15	84:24 85:3,6,7	118:1,12,19,22	MATTHEWS
129:14 159:21	166:18 168:12	85:24 86:6	118:24 119:2	1:4 230:4
189:5 212:19	169:8,12	87:5,13,21	119:14,22,24	Mattingly 10:25
lowest 211:25	173:16 178:15	88:10,24 89:5	120:8,14,18	11:3 211:3
212:16	181:18 183:1	90:4,5 91:2	121:8,14,17	Mattingly's 5:22
LULAC 30:14	185:14,17	96:4 97:6	123:10,16	13:1 32:2
31:8	191:21,22	103:17,23	124:1,7,18	208:21,25
lunch 76:22	192:1 193:9,24	104:5,6,15,21	125:18,20,25	209:14 211:13
113:25 127:8	193:24 194:3	105:5,10	126:6 132:3	214:3
M	195:3,14	106:23 107:9	175:25	McDonald
magically 41:5	197:14,17,19	108:22 109:4	mark 10:9 35:18	185:3
main 221:13	199:19 209:7	109:20,24	41:20 45:25	mean 7:24 9:5
maintain 144:3	210:7,9 211:10	110:7,13	57:7 64:2 72:9	13:20,24 19:21
	211:13 217:2,6	111:21,25	79:17 81:17	20:1 27:11,14

34:8 35:15	Michigan 28:6	181:20	municipality	needed 137:23
37:17 41:16	61:3	minutes 76:24	160:3,10	138:4
44:15 46:20	middle 5:9 76:18	228:19	mutate 82:21,25	negative 129:1
69:18 84:17	80:13 82:20	misleading	<hr/>	Neither 116:3
92:3 104:3	88:19 141:8,11	177:23 182:13	N	Nelson 2:6
115:10 119:24	147:15 156:25	193:7 195:23	N 3:1 119:21	nervous 109:19
123:22 125:15	178:16 211:22	misremember	120:6 125:16	nested 21:20
127:17 133:23	midway 103:1	26:24	NA_black_M...	never 5:21 13:13
137:6,7 146:8	miles 170:18	missed 105:18	89:15	23:25 29:3
153:13 155:1	195:13	117:6	Nairne 28:23	75:14 107:10
156:10 157:6	military 72:3	missing 142:15	29:24 30:24	152:9 176:2
158:2 159:25	Milligan 15:6	misstating	31:13 137:13	215:24 219:20
162:8 170:8	16:25 17:2	192:20	142:7	223:23
171:8 172:15	31:12 160:7	mistake 74:6,7	name 4:7,10,13	nevertheless
173:6 174:1	millimeter	85:2 88:3	15:12 185:5	214:13
177:15 181:16	172:19	90:17 130:10	210:24 218:1	new 14:4 15:18
182:15 185:23	mind 28:6 136:7	131:19 175:16	Nassau 15:18,20	15:19 113:24
190:19 192:1,2	136:13 159:7	210:2	16:4,20 17:2	134:19 147:15
202:22 206:25	178:2 184:16	mistakes 41:9	Nation 47:13	219:2 222:1
216:16,19	185:2	152:24	49:9,10,14,17	newer 22:20
meaning 167:14	minds 195:5	misunderstood	51:9	nice 113:10
182:14	mine 148:4	211:8,11	Nation's 49:19	197:7
means 19:24	minimize 214:4	mixing 105:14	native 90:2,6	nine 87:24
21:24 34:20	minimizing 47:5	109:9,9,12	178:21 179:1	nit 208:7
116:20 131:25	47:11	121:10	180:6,15	non 186:23
132:1 160:4	minimum	model 23:6	210:18	187:8
181:23 191:5	143:20 212:2	MOE 81:7,11	naturally 211:18	non-citizen
meant 69:18	212:20	82:21,25	nature 16:11	36:11
78:17 107:2	minor 78:15	moment 111:12	17:11 188:21	normal 36:24
137:8	minority 24:9,15	137:13 139:12	NC 2:7	128:22 129:5
meeting 138:19	24:15 25:4,16	money 153:19	NCLCV 27:5	129:12 131:6
memo 35:23	28:14,14,20,20	month 60:24	near 122:5	185:18,20
36:3,4	29:1 33:14,15	95:21,25 96:1	143:23 157:16	192:5,6
mentioned 86:8	46:14,16,19,21	226:5,8	170:9,14,15	normally 120:25
217:18	46:25 47:9	months 48:23	183:7 186:9	130:3,6,9
merits 42:15	50:14,14 51:14	49:22	nearby 22:13	North 1:1,7 6:19
mess 49:11	53:13 55:15	Moore 30:18	nearly 183:13	7:2,5,9 9:9
meter 171:1	58:10 59:12,23	31:9	185:11	15:11 16:20
method 70:11	60:12 150:23	morning 4:7	necessarily	17:1 18:8,23
79:13 103:14	159:18,21	MOSES 1:3	91:19 104:3	18:25 19:2,20
106:24 112:6	178:5,7 180:2	230:3	138:12 139:11	20:5,9,12,14
112:15 113:2,8	187:22 188:14	move 127:11	159:24 160:5	20:20,24 21:4
methodology	214:12,12,13	128:21 225:15	161:8 170:8	23:8 26:1,4,6,8
41:10,15,17	214:14,23	mu 129:1	177:6 185:14	26:10,14,19
46:24 51:15	216:1,22	Mullins 2:6	need 14:25	38:15 66:21
52:7,14	minorly 195:23	multiple 62:13	35:25 85:7	67:2,10 68:18
methods 41:1	minus 99:19	87:6 131:1	118:17 138:8	68:21 69:15,24
metric 36:13	112:17,22	164:19 192:12	138:15 191:1	70:1,5,19,22
metrics 190:24	124:5 129:1	municipalities	211:9 228:13	71:7,14,22
Michael 185:3	minute 86:3	159:20	229:6	72:5,16 73:9

73:14 74:2,22	59:25 60:1	160:6 163:19	okay 4:24 5:11	75:7,9,22 76:1
75:11,12,20,23	67:14 83:19	167:7,18,25	5:16,19,22,25	76:16 77:9
76:5 117:2,2	86:4 99:7,12	168:9 171:25	6:3,6,11,19 7:4	78:2 79:1,12
134:17 147:16	100:14,18,22	174:25 178:1	7:8,21 8:5,16	79:23 80:2,12
147:17 206:6	101:4,25 102:3	178:19 181:14	8:18 9:19	81:4,14,22
212:4 213:5	102:14,16	183:15 189:1	10:16,23 11:7	82:1,13 84:2,7
217:21 230:1,7	103:6,11 121:2	191:10 194:4	11:14,23 12:8	86:25 87:12
231:1	121:4 133:22	194:23 196:18	12:12 13:1,7	88:15,18,19
northeastern	181:20 185:20	198:23 200:17	13:13,16,22	90:9 91:17,24
18:23 38:15	187:16 206:20	200:21 201:1,5	14:6,22 15:16	93:12,20 94:14
northern 164:22	206:23 207:3	207:24 215:13	15:20 16:3,7	94:20,25 95:3
northwest	210:18	215:21 224:6	16:19 17:1	95:24 96:15,23
158:23 164:25	numerator 63:7	224:13,17,22	18:11,19,25	97:13,17 98:18
Notary 230:17	63:18 64:9,11	226:12 227:9	19:7 20:8,11	99:5,18,24
note 49:8	64:14 85:11	objections	20:19 21:7,17	100:6,13,21,25
noted 22:24	87:22 88:12,25	208:13 228:17	23:8,21,25	101:14 102:8
notes 6:6	89:6 119:9,12	objects 4:25	24:4,13 26:18	102:20 103:1
notice 1:12	120:9 123:15	obscuring	27:4,9,16 28:9	104:7 105:9,21
84:13	123:18,23	173:12	29:5,21,24	106:2 107:12
nuance 70:11	NW 2:3	observations	31:1,17 32:6	107:17 110:23
76:10		118:12 119:5	32:17,23 33:2	111:3,11,24
nuances 62:25	O	124:12,14	33:5,9,18 34:4	112:5,14,21,25
number 4:14	oath 4:3	125:23 126:5,7	36:3,9,17 37:4	113:7 114:9,17
15:17 20:2	object 77:10	189:20 203:19	37:12 38:6,14	114:24 115:22
34:25 35:1	objected 29:15	obvious 125:17	38:18,23 40:6	117:17 118:9
36:20 39:4	objection 8:13	Obviously 30:21	40:13,20 41:18	119:16 121:23
43:22 62:18	24:25 28:15,21	occurs 210:14	42:1,11,17,25	122:5,13,18,21
64:19 65:5,16	29:1,8 30:2	218:24	43:3,6,7,14,23	123:2,6,9
65:24 67:1,9	35:4,13 37:15	odd 52:19 162:3	43:24 44:7	124:24 125:13
68:8 69:1,14	38:24 39:5,17	166:2 167:2,13	45:22,25 46:5	125:18 126:23
69:14 70:22	40:10 41:13	167:17,20	46:14,19,23	127:6 128:9
72:21 73:1	45:11 48:1,21	168:2,14	47:15,22 48:4	129:3,9,17
80:6,7,14 81:9	50:18 51:17	offer 108:13	50:12 51:12	130:11 133:4
83:8,21 88:11	52:11 53:17	134:24 135:4	53:12 54:2,8	133:16 134:10
88:25 97:19	54:22 55:11,18	135:24 136:9	54:16,19,25	134:17,21,24
99:19,22	57:14 64:21	136:13 159:9	55:8 56:1,5,9	135:4,9,15,24
101:14,17,23	65:2,8 69:2,17	159:12 208:24	56:24 57:4	136:4,8 138:18
102:4 103:5	70:7,16,24	217:9	58:8,23 59:2,5	139:8,15 140:5
119:5,15,16,25	74:3 76:6,14	offering 29:18	59:9,10,15,17	140:21 141:13
121:5,18	84:5,16 90:25	135:21 139:12	59:21 60:5	144:2,12,18
124:12,14	106:5 110:14	Office 72:5,16	61:24 62:4,15	145:11 146:11
125:22 126:5,7	114:22 115:6	74:22 75:11	63:5,5 64:5,12	146:16,21,25
131:9 153:21	115:14 116:2	offs 184:16	65:4,12 66:3,3	147:5,12,20
165:9 176:19	116:13,19	offset 119:11	66:11,15 67:4	148:6,14,17
176:19 183:13	117:13 120:21	oh 2:10 21:16	67:9,14,22	149:13,17,24
185:11 189:10	123:13 126:18	30:18 32:2	68:11,12,20	150:10 151:11
193:14 194:20	127:16 129:25	64:5 97:15	69:14,22 70:18	151:17,25
208:6 211:25	143:8 145:20	107:1 109:15	71:19,21 72:14	152:6,13,17,19
214:15	146:7 155:22	132:16	72:24 73:3	152:20,23
numbers 58:23	156:7 159:23	Ohio 6:14	74:12,19 75:4	155:16 156:20

160:2,19 161:1 161:4,23 162:9 163:12,16 164:11,15,24 165:7 166:1,8 166:21 168:18 168:23 169:1 169:11,18,18 170:4,7 171:2 171:14,23 172:2,6,23 173:10,14,21 174:1,15,22 175:8,17 176:6 176:18,24 178:11 179:19 179:23 180:5 180:21 181:19 182:1,17,25 183:10 184:5 184:18,25 185:6 187:2 190:2 191:5 193:22 195:25 196:14 197:13 199:9,21 200:3 200:15 201:15 202:11,15 204:3,7,17,18 204:19 205:1,5 205:9,13 206:4 206:9,17,23 208:10,14,17 208:24 209:3,8 209:21 210:2 210:21 211:13 211:19 212:10 213:1,3 214:2 214:7,16,24 215:10,18 217:1,17,25 218:7,8,14 219:17 220:2 220:15 221:1,8 222:11,24 223:16,19,25 226:3 227:13 228:5,10 old 35:25 Once 96:6	ones 83:24 141:2 205:22 ongoing 217:24 217:25 Onondaga 15:18 15:23 16:5,20 17:2 opaque 200:7,16 200:19,20 open 10:16 41:25 46:4 72:13 74:16 82:21 92:9 93:8 94:12 146:16,21,25 147:2,5,13 184:4 204:16 210:12,12 opened 92:16,25 opening 5:16,19 13:5 operate 39:20 opinion 12:12 18:15 19:11 86:18 108:13 108:16 134:24 135:5,24 136:9 159:9,13 165:16,21 167:6 208:24 225:24 opinions 31:17 135:21 136:13 136:18 217:10 224:1,4 225:18 opportunity 28:14,20 215:19 216:2,8 216:14,17,21 225:14 opposed 189:7 200:20 opposite 46:17 186:8 191:9,12 195:12 211:19 optimal 211:4 option 63:10 197:21 options 142:10 185:7	orange 171:19 171:19 172:24 173:12 175:10 178:12 180:23 181:5,8 182:17 182:21 184:12 191:6 oranges 187:4 order 23:3 86:11 176:7 original 186:10 ornery 128:4 ought 110:21 211:1 Outer 8:24 9:3 output 212:11 outputs 190:15 outside 94:1 116:6,7,11,17 127:1 156:21 158:11 187:20 overall 103:12 151:14 162:3 178:13 193:8 203:5 overlap 92:14 93:17 oversampled 39:16 oversampling 40:8 overview 207:9 overwhelm 125:22 126:9 overwhelms 126:4	68:11,23 70:1 70:19 72:22 73:4,5,6 75:3,7 78:6 80:9,14 82:16 86:23 87:1,24 88:16 88:19 94:18 96:19,21 99:3 99:19,24 100:3 100:25 101:10 102:20 107:13 114:4,10 117:21,23 120:11 121:21 128:8,17 133:4 133:15 136:21 140:13,17,18 146:11 150:10 152:8,17,17 154:16 160:14 162:1,1,20 169:1,11 171:3 172:2,6,13,19 172:22 173:21 174:1,24 175:11 179:23 186:13,13,14 202:4 204:18 205:9 206:7,13 206:19 209:3 210:19,20 211:3,20 213:18 218:8 219:22 220:13 220:24 221:1 222:2,6 pages 59:6 183:20 226:8 230:10 Palmer 42:4 46:8 53:22 56:24 57:23 58:24 179:16 179:20 216:9 pandemic 36:25 38:12,21 Panera 114:7 paragraph 46:24 66:15,19 66:24 71:13	78:6 99:6 100:11,25 101:4,15,17,25 102:8,22 103:1 103:7 139:16 142:6 144:19 144:25 211:22 222:6,19,20,23 223:5 parameter 200:3 parameters 202:8 parentheses 80:14 81:7,11 82:21,23,24 87:2 88:21 102:11 part 7:22 8:1 12:24,25 20:24 27:5 29:5 32:7 32:21 61:21,21 62:1,1,1,2,4,4 62:8,9,18 63:2 63:6,6 64:3,3 64:20,24,25 65:6,13,14,17 65:20,20,25 90:1,1,1,2,5,6 90:6,6,11 91:4 91:9 116:5,16 120:7 121:7,19 127:20 147:4 161:15,17 164:22 167:1 168:4 170:11 173:13 183:18 207:14,18,21 225:2 partial 105:2 particular 29:7 34:5,13,15 35:11,12 59:6 68:4 80:3,5 91:19 110:8 119:25 194:19 194:21 216:7 particularized 189:18 parties 213:12 parts 12:22
--	---	---	--	--

124:13	173:6,9,12,15	133:10,17,18	225:23	163:22 170:4
Pasquotank	173:19 176:8	133:19,22	performing	193:20 194:6
9:21 114:13	177:20,20,22	134:2,3,8	214:8,20 217:2	places 20:3 30:8
115:19,23	180:23,24	137:11,16,20	217:7	210:10
116:1 118:23	181:4,9,11,24	137:24 138:1,4	perimeter	plaintiff 28:3
120:18,20	182:6,19,19,22	138:11,14	143:21	30:21
121:15 122:2,2	182:23 183:14	139:4,10,20	period 7:5	plaintiff's 16:18
123:11 125:9	185:11 187:6,6	140:12,24	person 138:4	plaintiffs 1:5 2:5
153:2 154:12	191:6,7 192:10	141:5,17	157:5 169:22	60:8 139:6
154:13,14,23	192:10 193:1,8	142:24 144:3	169:24 170:14	143:11 178:7
155:17,20	193:9 194:21	148:2,5,5,7,12	172:7 173:20	199:7 202:16
156:11 157:20	194:21 195:8	148:15,18,18	181:16 182:3	230:5
158:16 161:10	196:4,9,10	148:24 149:2,8	182:15 184:8	plaintiffs' 10:24
161:12,16	197:1,2,10,11	149:8,10,11	192:24 205:5	12:4 85:21
202:19	199:2,23,24	150:11,12,13	205:13	86:13 87:19
Pasquotank's	200:7,10,15,16	150:13,15,15	PH.D 1:12 3:2	88:6 90:14,23
156:4,17	200:19,20	150:19,20,24	4:1 231:3	plan 176:11
pass 210:6	201:12,13,21	150:25 151:3,4	phase 12:7,9	plans 36:5 42:12
passing 23:11,23	201:22 205:2,3	151:9,9,12,13	42:15 44:20	platform 32:7
Patrick 4:12	205:15,16	152:7,7,15,15	45:3,15,19	please 4:10
pattern 187:23	207:7 217:20	154:19 158:10	57:5,13,15,23	10:17 35:25
190:5	218:6	158:11,25	58:1,22 61:4	36:7 174:15
pay 127:19	perceive 172:4	160:4 162:20	Phil.strach@n...	plot 128:11,13
PDF 54:1 72:23	percent 34:10	162:24 164:6,7	2:8	128:18 172:7
82:16 140:18	43:17,23 44:1	164:12,20	Phillip 2:6	176:1 177:19
140:20	44:4,9,12,15	166:5 177:5	physical 111:5	178:3 180:12
peer 19:24 23:12	44:18,20 45:1	212:5,22	PI 12:7	181:5,14,15
23:15 25:10	45:3,9,14,21	214:10	pick 52:2 181:16	182:18 184:7
31:21 88:15	50:1,2,15	percentage 34:5	184:1	184:10 185:25
198:7,10 199:9	51:14 52:4	34:7,15,17	picked 46:17	188:18 190:3
199:12	54:4,5 55:15	35:11 79:3	picky 208:7	195:3,7 199:22
peer-reviewed	55:19,25 56:2	80:2,18 83:2	pie 128:25	200:4,24
21:11	56:4 57:20	84:3 85:12	PIERCE 1:3	204:21 205:10
pen 201:18,19	58:4,8,12 60:2	100:15 111:25	230:3	plots 145:5,6,8,9
202:1	60:7 62:17	112:2,9,17,18	pipe 82:24	145:13,13,16
pendency 77:15	84:21 85:25	121:25 151:14	pitfalls 109:17	145:25 146:1,6
people 22:3 58:2	96:8 99:19	155:16 156:17	110:19	146:6 173:7,22
61:21,25 62:4	101:12,14,20	163:2 177:2	Pitt 8:18,25 9:2	174:9 175:13
62:9 64:2 65:9	102:4,6,7,10	perfect 197:23	211:6,10,14,24	175:17 176:6
73:15 74:2	102:10,11,18	perfectly 183:16	place 50:22 59:7	177:19,23
75:18 78:9	103:3,8,13,13	perform 13:23	93:18 101:6	178:20,24
89:19 119:6,8	107:8 112:22	14:6 212:8	114:2 127:7	180:9,22 182:5
119:15,16	129:12,14,18	216:11	156:4 164:2	182:15 183:16
121:18 122:9	129:22,24	performance	192:21 209:22	184:2,16,18,20
122:16,19	130:17,20,21	12:24 16:12,16	211:25 213:17	184:22,23
133:25 165:16	131:14,15,16	47:17 48:6,16	231:7	185:1 187:3,7
165:21 167:20	131:16 132:1,2	49:2 214:16,25	placed 156:17	188:2 190:12
169:24 170:8	132:13,15,17	215:11	170:2,3 211:1	190:13,19,22
170:25 171:18	132:17,21,23	performed	211:1	190:25 191:1
172:18,18,24	132:24 133:6	16:13 97:13	placement	192:14 195:6

196:1 198:6,8 198:11,17 199:11 201:16 202:24 204:25 205:24 217:19 plotting 157:12 172:8,15 173:13,18 182:11 183:23 200:14,18,22 201:2,11 205:8 plus 44:15,18,20 45:3,14,21 52:5 55:15 56:2 58:12 60:2 96:8 99:19 112:17 112:22 116:24 137:11,20,24 138:4,14 139:4 139:10 160:4 point 19:23,25 44:2,3,5,11 45:20,20,22 48:19,24 50:2 58:4,20 61:12 61:16 66:8 74:8 78:15,19 79:3,8 80:18 85:12 89:4 110:18 124:5 129:13,14,17 129:21 130:18 130:22,23 131:4,6 132:11 168:10 182:8 183:17 188:8 191:14 195:7 202:24 203:17 205:23 pointless 161:22 points 112:18 poison 181:17 184:1 political 16:1 20:23 21:9 24:22 25:2 26:4,7,9,13 167:14,23 168:1	politics 17:16 18:3,9,12 20:1 20:2,10 24:9 24:15 25:4,16 26:9 47:17 48:7,11,16 49:3 131:1 poll 18:14 19:8 130:20 131:12 131:13,15 132:2 polling 18:15 19:11 polls 130:6,6,22 131:1 pop 109:17 populated 203:6 population 24:5 33:10,14 34:6 34:16,22,23,25 35:2,3,10,12 39:3,15 43:17 44:1,9 45:1,9 50:15,25 51:14 53:13 63:3 64:13,20 65:6 65:16,24 67:11 67:12 69:15 70:18 71:1,6 73:10,17,19 75:13,21 104:7 114:13 117:24 117:25 118:2 118:19,24 119:2,17,23 120:5,12,15,19 120:25 121:5 121:10,11,15 121:18 122:9 123:3,5,11 124:3 125:19 125:21 126:2 130:4,5,7,10 130:21,23,24 131:3,10,10,14 131:21,24 132:3,9,20,25 133:2 137:9,18 138:9,13,15,20 139:1,2,3,5,10	140:3,8,11 141:1,6,20,25 142:6,22,25 143:1,6,14,17 143:22,23,24 144:8,17,22 150:2 151:11 155:17,21 156:14,18 157:20 159:4,7 159:8,18,21 160:4 162:4,5 162:11,11,21 162:24 163:3,7 163:8,9 164:7 164:8,8,12 165:4,18,23 174:12,13,23 176:9,17 177:1 177:10,16,17 178:4,12,14,15 178:17,23 179:2,3 180:2 180:3,6,15,18 183:11,12 185:9,10 187:20 188:14 188:14 196:23 201:8,10 202:19,23,25 203:3,4,11 212:2,3,18,18 212:21 222:22 populations 74:11 111:9 120:13 140:6 180:3,19 186:22 187:2,5 187:22 189:18 223:9 Porter 2:2 4:9 portion 93:23 115:23,25 117:1,2 126:11 126:13,16,20 126:21 154:14 158:23 161:10 161:18 206:17 214:2 217:12 portions 105:1	126:24 127:1 155:5 portray 183:11 185:8 position 29:5,11 77:13 216:6 223:24 224:25 possibility 132:21 possible 36:18 40:5 47:16 48:14,14 63:24 64:22 70:17 76:15 92:8 116:9 118:18 119:8,10 143:4 159:17 172:23 182:24 possibly 12:19 137:8 202:22 post 160:7 potential 33:14 42:20,21 113:17 potentially 148:21 179:6 power 42:13 practice 215:1 215:10 precedes 155:11 precinct 22:11 141:3 150:22 150:23,25,25 151:2,3,8 166:3 176:25 177:9,13 precincts 22:1,9 22:13 72:2 139:18,20,25 140:9,10,22 141:15,17 177:24 precise 142:4 184:24 207:3 223:4 precisely 181:13 181:14 predominance 159:13,16 predominantly	157:25 predominate 47:5,10,18 48:7,11,17 49:4 50:24 51:5,16 52:10 53:16 predominated 159:10 160:5 predominating 47:24 50:6,16 prefer 131:4 preferred 198:6 preliminary 9:14,23 10:2 11:24 60:10,16 60:20,24 61:8 preparation 5:23 6:1,4 12:3 prepare 5:11 12:6 preparing 10:2 11:15 presence 36:11 present 57:6,12 57:21,22 59:3 215:5 presented 56:6 83:22 presenting 43:24 55:9 58:16 194:17 194:20 preserve 156:2 preserving 159:20 presidential 17:22 23:20 26:12 presumption 190:7 pretty 55:3 61:9 62:18 97:22 133:1 137:22 138:3 162:15 170:13,21 174:5 180:7 182:15 183:2,3 194:24 195:2 200:2
---	--	---	---	---

previous 86:9 222:7,25	41:6 191:22	225:3,12	qualifies 216:17	212:10,13,24
previously 6:20 25:19,19 33:13 79:6,7 86:21 203:18	proceed 109:1	226:12 227:4,9 227:17,21 228:6,10,14,20 229:7	quality 14:12	R's 92:24 93:6
primarily 29:21 30:4 159:22	process 56:10,14 56:14,18 92:24 206:14,21 207:4,5,9	prove 60:8	quantitative 134:6	race 24:22 26:15 47:17 48:7,10 48:16 49:3 50:23 51:9 62:12 158:1 159:10,22 160:5 198:12 198:13 215:9 216:22 218:25 219:6,8 221:18 221:22 222:3,9 222:15 223:2,4 223:6,11
principle 115:17 117:9	produce 44:8 82:7 107:23 108:15 112:7 188:17 198:5 209:16 210:9	provided 99:7 225:16,20	question 4:25 5:2,9 9:17 34:1 34:18 35:6 39:21,24 43:9 45:7 50:8,9,11 50:12,13 51:5 62:23 63:10,13 63:25 64:5,5,8 95:8 111:11,13 145:4 158:6 178:5 185:6,8 197:24 207:2 224:9 226:24 227:1,18,21 228:6,7,11	rac 17:23 18:4 18:6,9 20:13 20:14,17 26:16 177:22 202:8 205:17 215:1,3 215:5,12,14 216:19
principles 47:11	produced 13:11 33:19,23 82:5 91:24 92:4 182:16 192:23 209:13,20 210:8 211:18 226:8	provides 70:12	questioning 76:18	racial 47:4,24 50:5,16 51:16 52:9,24 53:4 53:15 62:12,13 154:20 155:4 158:3 159:15 190:3,25 218:11 220:1 221:25 222:12
print 172:20	produces 113:3 191:24	public 18:15 19:11 230:17	questionnaire 63:16	racialized 178:9
printers 197:6	producing 78:8	published 19:19 19:21,22 21:2 21:3,11,15 23:12,15 24:1 24:4,8 25:9 134:1,3,4	questions 4:22 24:16 114:4 168:18 184:6 225:1,8 226:21 228:16,22,24	racially 160:11
printout 67:24 72:16 74:21 210:20	production 210:7	publishes 72:6	quick 166:10	radically 190:14 190:16 191:23 191:24 192:25 194:9 195:4,22
prints 91:16	program 31:23 93:10 209:19	publishing 19:24	quickly 22:22 60:21 192:11	Raffensperger 27:23
prior 37:7,14 59:8 77:22 78:3 145:9 214:17 216:7 221:20 222:13 222:18,23	programming 22:18	pull 23:17 106:20 119:6,8 202:3	quite 34:20 55:22 65:18 181:1,1	raise 36:12 45:18 49:1 57:16 212:2
prioritizing 47:10	proof 53:20	pulled 73:22 219:16	quote 212:19,22	raised 37:20 87:17 95:9 98:12,15 159:4
privacy 218:19 219:1,8 221:5	proper 207:17	purple 171:8,11 171:24	R	raises 154:19 175:20
privilege 226:14	proportion 63:18 64:4 80:3,5,21 85:7 87:23 89:1,7 99:25 108:23 111:21 114:18 118:15,16 123:24 124:25 129:4	purport 209:9	R 31:25,25 66:25 67:2 69:7,10 71:19 74:5 81:23 91:11 92:21,22 96:16 97:13,17 146:15,22 161:25 168:23 170:3 188:10 196:11,12 198:18,20,24 198:25 209:20 210:9,18 212:9	raising 165:4
privileged 77:19 225:2	proportions 186:4	purpose 61:24 151:17		Raleigh 2:7
probability 128:23 132:8	proposed 32:16 49:13 54:3	purposes 31:18 62:5 65:1 104:20 110:13 139:1 178:6 187:6 225:10		ran 16:17 92:21
probably 8:3 11:9 48:14 60:19 69:21 71:1 96:13 113:25 114:4 124:16 125:12 137:4 141:21 142:4,18 151:5 154:2 156:13 157:12 170:15 182:10 183:24 187:22 195:2 206:25 220:14 226:9	pros 199:14	pursuant 1:12		
problem 44:14 114:3 183:3,5 187:15 219:2	proscribed 52:4	put 38:8 131:5 148:9 170:25 181:3 198:18 201:4 223:5		
problems 21:9	protect 223:8	puts 209:21		
	protected 226:14	putting 37:18 103:16 109:23 185:6		
	Prouty 2:9 215:13,21 224:6,13,17,22	Python 32:3		
		Q		
		qualification 24:19		

131:11 208:22 209:17 random 163:22 182:9 186:23 187:8 randomized 189:19 randomly 164:2 170:3 186:11 186:22 187:14 188:5 218:10 219:24 randomness 191:14 range 148:24 150:20 rate 38:1 103:14 150:15 189:12 rates 150:8 rating 17:21 raw 221:6 reach 67:11 138:16 139:24 167:16 212:14 224:11,15 226:5 reached 216:6 read 5:21 12:7,8 12:11,20,23 13:4 18:17 36:15 54:6 93:18 102:3 127:18,21 130:12,14 137:3 139:22 150:17 153:4 160:24 169:6 172:10 197:4 211:7 219:20 222:21,23 228:25 230:10 real 25:19 55:13 74:8 RealClear 17:16 18:3,9,12 20:1 20:2 130:25 reality 182:21 really 33:4 44:4 85:19 86:14,15 128:1,4 134:3	140:7 143:16 146:3,8 153:17 153:20 154:4 157:11 158:5 161:20 167:5,9 171:22 172:22 172:23 175:19 175:21 176:3 178:12 180:16 192:11 216:24 reason 5:4 64:17 68:1 72:18 73:11,24 75:15 76:9 82:2,7,12 90:3 92:23 93:6 105:11 106:2 109:6 110:10 112:12 116:18 118:10 147:19 168:22 171:23 180:11 186:7,21 189:8 190:4 194:16 200:1 220:8 reasonable 11:5 153:25 195:5 reasonably 47:14 136:1,5 136:10,11 168:13 reasons 22:14 53:4 125:17 rebuttal 5:14 6:9 12:22 13:1,16 13:19,20 16:9 94:16 98:24 106:21 107:12 107:17 112:5 112:14 113:1 115:1 117:9 121:21,22 124:21 126:1 127:12,15,25 136:16 140:14 154:4 202:3 206:11 225:25 recall 9:22 10:1 11:2,14 12:8 12:10 15:4 37:12,18,24	49:9 56:20 61:8 83:15 97:24 128:24 received 95:21 receiving 11:2 13:18 Recess 32:18 76:25 127:9 166:12 203:15 217:15 228:21 recognize 10:14 35:23 36:4 42:2 46:6 79:24 81:23 94:15 98:23 129:8 166:18 179:19 219:18 recollection 49:20 67:13,16 104:13 161:7 179:25 226:2 Reconsidering 23:19 record 4:11 10:18 24:11 130:14 217:14 recorded 231:5 records 72:19 75:1 red 171:10,19 redistricting 32:6,9,11,14 36:5 40:20,24 40:25 41:10 51:4 56:15 62:10,11 92:17 93:1 98:2,9 134:18 135:1,6 184:21 185:1 208:5 reduced 96:5,10 refer 9:6 18:1 33:9 54:8,11 166:2 218:4 reference 128:17 190:20 referenced 51:21 referring 20:16 154:23 158:20	172:12 184:8 184:19 190:21 refers 54:16 154:12 reflect 146:19 reflecting 72:20 75:20 reflects 147:18 refresh 179:25 regard 212:1 regarding 15:13 17:7 26:9 88:1 region 26:20 34:5,15 35:11 35:12 38:15 64:23 80:3 85:9 91:19,20 110:8 114:18 115:4 117:10 117:12 137:8 172:25 regions 111:4,8 111:12 173:5 regression 22:3 regularly 69:10 78:9 reject 132:21 rejected 152:14 relate 136:6,13 related 25:6 114:1,5 118:1 118:14,24 119:2,23,24 120:14,19 121:15,17 123:10,14 124:7 125:19 125:20 126:1,8 219:5 relates 19:20 relating 20:5 36:5 38:1 relative 192:10 231:8 relatively 38:20 189:10 relevance 203:9 relevant 22:5,13 64:23 85:9 161:25 172:25	reliable 33:19 40:23,25 reliably 114:6 reliant 92:6 214:14 relied 37:6 40:20 79:12 145:6,8 145:12,16,25 146:5 199:17 199:22 rely 78:9 92:24 134:22 146:3,9 146:10 relying 60:8 69:11 remain 211:6,14 remaining 126:20 remains 97:22 126:21 remedial 42:18 42:21,22 43:5 43:11,16,24 44:17,20 45:3 45:8,15,19 46:11 49:13,15 57:5,13,15,23 58:1,22 61:3 remedy 49:16 remember 6:2 9:18 11:5 14:13,15 18:10 19:6 20:22 23:24 30:7,10 31:6,14 32:9 33:1,3,6 48:13 48:24 49:18 61:13,17 87:16 89:2 90:7 98:11,12,17 100:9 120:2 148:3 153:8,17 153:23 174:20 174:22 216:15 220:17,18 remove 142:22 144:4 removed 139:19 139:21 140:1 140:11,23
--	---	--	--	---

141:4,16,18 removing 143:2 143:5,19,22,25 render 96:8 repeat 28:15 43:9 132:1 165:20 repeated 130:8 130:16 132:2 192:7 repeatedly 226:20 rephrase 114:24 replicable 213:2 replicate 193:19 194:2 replicated 83:16 replicating 191:20,22 192:1 193:25 report 5:13,16 5:20 6:8 9:23 10:2,6,15,20 10:24 11:8,15 11:21,25 12:22 13:2,5 14:17 15:7 17:5,9,19 18:19 19:4,7 19:10,13,16 21:17 24:12 25:13 27:18 28:25 30:5 31:19,19,24 33:3 37:17,19 37:25 46:7,10 46:15 51:12 53:22 54:3,19 56:6,17,22,24 58:24 59:6,17 60:11,25 61:9 66:4 67:15 68:23 69:9 70:1,4 75:22 77:7,8 78:7,15 79:1,12 83:22 86:4,10 87:10 93:24 94:16,21 95:22 96:19 98:24 99:1 100:3,4,10	101:1,4,7,11 101:12,16,25 102:20 103:2 106:21 107:5 107:13 114:10 117:21 121:22 127:15,25 128:15 133:5 134:11,21,24 135:4,24 136:8 136:16 140:14 149:14,18 150:7 151:21 152:1 153:12 153:13,22 157:24 160:14 169:1 170:5 175:12 179:16 179:19 182:6 186:14,15 202:4 206:7,11 206:18 208:21 208:25 209:4 211:8,20 213:18 214:3 218:8 220:10 225:2,5,25 226:9 report's 74:1 reported 75:17 96:4 101:17 104:19 108:21 112:9 113:4,22 121:10,11 133:17,18,22 221:5 Reporter 1:12 228:25 229:2 231:3,13 reporting 18:25 19:2 60:1 68:20 69:24 reports 5:14,14 5:23 6:9 9:15 10:24 11:2 12:4,9,20 13:8 13:17,19,21 14:13 15:17,18 15:20 16:9 37:8,14,21	93:25 104:14 111:17 112:21 represent 73:11 95:16 180:23 180:24 181:21 representation 154:5 represented 44:24 45:8 55:14 73:23 80:21 81:6,11 representing 200:6,10 201:21,22 220:7 represents 148:1 148:14 165:11 172:7 request 49:17 requested 130:14 requests 47:13 49:9 51:8 require 49:3 133:6,10 134:7 196:1 required 15:3 29:7,10 30:11 30:15,20,22 44:17 137:1 requirement 43:15,22 requires 143:12 rerun 96:16 reruns 211:3 research 23:2 199:25 resident 138:22 residents 62:6 69:21 70:19 71:15,22 75:23 76:5 136:25 138:8,8,24 139:1 152:21 153:1 156:4 157:11,14 160:20,21 161:24 169:4 174:3 175:1 176:19,20,22	177:16,17 186:1,2,2 189:9 194:10 194:10 203:9 resizing 201:24 respect 20:20 25:21 49:8,16 78:5 132:11 152:6 190:25 respecting 47:12 respond 10:24 38:11,20 208:21 responding 127:20 response 12:16 34:18 36:22 38:1 39:2,8,10 39:13,15 40:1 40:7 58:8 64:24 227:16 responses 37:7 39:2 54:21 119:25 126:12 127:4 130:4,5 responsibilities 18:12 responsible 210:2 rest 40:2 144:16 144:16 161:18 restating 22:21 result 39:2 93:18 113:2 131:23 resulted 40:8 87:18 90:14 results 62:18 131:12,13,16 133:16,25 134:4 retain 183:21 184:10,15 return 203:17 reveal 224:19,23 review 5:16,19 5:22,25 13:1,7 43:25 133:20 136:15 206:10 206:17 214:2 reviewed 5:13	12:4,21 19:24 23:12,16 25:10 31:21 49:22 93:23 99:1 107:20 134:10 198:8,10 199:9 199:12 reviewing 13:16 13:20 51:12 103:10 revisit 49:14 right 4:7,14,15 4:19 5:4,7 6:14 6:15 7:16 8:2,7 9:5,8,12,16,22 10:6,8,9,19 11:2,19 12:2 12:17 13:4,10 14:11,16 15:7 15:12 16:19,24 17:15,18 18:2 18:17 19:19 20:4 21:5,6,9 21:10,22 25:25 27:7,18 28:11 29:23 31:1,17 31:19,20,23 32:13,20 33:5 33:9,13,16 35:9 36:10 37:24 39:12 40:6 41:9,19 42:2,8,19,20 42:24 43:4,8 44:9,11,19 45:1 46:10,22 47:1 50:2 53:21 54:14,18 54:24 55:2 56:8,13,17 57:3 58:14,25 59:19 60:25 61:10 62:7 63:4,8,15 64:11,14,15,17 65:3 66:23 67:17,23 68:5 68:7,13,23 69:22 70:3,4 70:15,20,21
--	---	---	---	--

71:3,6,9,10,13	149:4,8,12,16	222:22 223:18	route 147:22	123:23 128:3,4
72:1,9,15,19	149:18 150:4	224:2 225:21	148:8	130:16 138:10
72:22 73:3,6,7	150:17 152:23	226:3,5,23	row 68:17,18	138:21 142:13
73:8,13,19,25	153:4,6 154:10	227:3,14 228:3	69:23	169:15 192:20
74:21,25 75:3	154:15,16	Rights 16:6	Rucho 26:23	194:18 225:9
75:10 76:3,13	156:2,21	23:22 24:1	27:3	says 41:8 47:8
76:24 78:5	157:16 158:23	25:15,20,22	rule 52:5,5	48:14,25 68:23
79:1,5,6,9,11	159:3,17	29:13 213:13	139:17 190:23	69:9 70:1
79:16,17,24	160:14,24	214:9 215:20	191:3 203:21	72:25 73:16,19
80:4,5,8,9,16	163:2,10	216:17	203:24 204:2,4	74:25 77:8
80:20 81:1,2,8	164:19 165:1,8	risks 150:13	213:4,9,20,25	82:3 88:20
81:9,12,17	165:15 166:1,8	roads 8:24	215:16	96:24 97:3
82:15,19 83:6	166:25 167:6	Robin 31:14	rules 194:8	99:12 101:10
83:16,19,20,21	167:13 168:21	195:25	219:8	102:9 144:12
85:2,5,10,14	169:6,11,20,23	Robinson 31:14	run 22:3 23:5,6	147:25 175:8
86:8 87:1,4	170:10 171:5	Rodden 169:3,9	53:7,8 131:15	179:16 192:18
88:23 89:9,14	171:14 172:12	205:1,11,24	150:13 190:11	198:8,11 204:1
89:16,17,25	173:16,25	217:19	192:3 208:11	210:22 221:11
90:3,12,17,19	174:23 175:1	Rodden's	211:5,13	222:7,15 223:6
90:20,21,24	177:8,18,19,21	184:22 205:18	214:22	scale 150:13
91:2 93:16,23	179:5,25 181:1	RODNEY 1:3	running 22:15	182:10
94:8,18,21	181:2,7,11	230:3	114:7	scales 150:11
95:6,22 97:6	182:4,7,19	room 82:10	runs 131:7,8	Scholer 2:2
97:11,16 99:1	183:8 185:16	119:12	rural 117:3	school 133:24
99:6,12,16,18	186:19,20	root 81:4 119:4		163:17
99:21,24 100:7	191:11 193:11	124:11 128:25	S	science 21:9
101:20 103:22	193:15,16,17	rough 71:4	s 2:2 3:4 198:25	24:22 25:2
103:25 104:10	193:20,25	round 148:3	S-e-a-n 4:13	133:5,10,16,21
104:11,14	194:18 195:9	188:10 193:16	safe 109:7 110:4	134:7 167:14
105:18 106:12	195:10,17,18	rounded 148:18	110:19	168:1
106:14,20	196:15,25	148:20 149:5	safer 109:25	scientific 153:25
108:18 112:19	197:2,11 200:6	181:12	safest 109:1	scientist 167:24
112:20,23,24	200:8,9,12,13	rounding 180:21	sample 34:9,13	scientists 51:20
113:6,23 114:9	201:13 202:9	181:17 182:9	34:20 116:23	scope 69:19
115:20 119:22	202:11,18	183:24 187:25	119:15,16	screen 6:12
120:2 122:3,8	203:14,21	188:6,11,24	121:18	122:10
122:13,20	204:11,21	189:4,14,15	samples 185:23	script 88:16
123:4,18	205:6,12,18,24	190:8,13 191:2	192:7	97:14,15
124:19 125:2,8	206:1,10,16,22	191:21 192:2,8	sampling 34:11	scroll 14:16
128:21 129:7	209:1,2,7,11	192:17,22	39:11	68:17 72:22
131:5 134:15	209:13,15	193:5,13,13,18	satisfied 30:1	73:3 75:7
135:3,8 136:21	210:1 212:24	193:23,24	saved 213:1	204:18 205:9
136:24 138:2,6	212:25 213:3,8	194:3,6,8	saw 85:18,24	221:1
138:21 139:12	213:23 215:17	195:17,19,20	86:10,12 90:13	se 213:25
139:15,24	217:5,9,13,14	196:2 203:18	96:6	Sean 1:11 3:2
140:13 141:23	217:17,21,22	205:19,25	saying 39:19	4:1,12 231:3
142:1,23	218:1,17	206:2	47:7,22 48:4,5	second 21:18
144:23 146:11	219:10 220:4	roundings 192:4	105:19 106:8	73:6 90:23
146:14 147:10	220:10,20	rounds 188:10	106:14 107:5	122:18,22
147:25,25	221:11 222:6	194:14,15	116:9,15	123:3 201:7

204:18 227:21 228:6,7 section 28:3 42:13 144:16 144:21 155:9 155:10 206:10 221:4 see 12:19 14:20 23:21 36:10 43:4 51:21 52:1,19 66:15 68:13,18,20 69:23 71:15 72:19,21,25 73:13,16 74:21 74:25 75:5,17 80:13 82:3,20 87:1 88:19 89:9,10 92:9 92:12,18 93:2 94:23 95:7,10 96:23 97:3 99:6,11 100:18 101:10 102:12 103:3 105:13 105:19 106:1,7 106:16 107:4 107:17 109:22 110:20 118:4 122:5,8,15,21 124:20,21,24 125:3 128:6 133:7,17,18 140:10,22 141:3 146:16 147:10,18 149:24 151:25 152:11 154:21 156:25 157:7 157:13,16,19 157:21 158:12 158:24 159:1 162:7 165:7 166:23 167:9 170:21 171:6,8 171:11 172:22 173:23 174:2,4 179:17 186:25 192:20 193:9 194:8 195:2,3	199:4 205:1 208:15,22 212:6 213:21 214:21 218:12 220:20 221:4 221:14,18 222:6,19 228:15 seeing 194:1 seen 68:3 95:24 109:16 110:1 129:10 133:21 169:10 188:19 204:20,23 207:16 208:1,1 select 91:18 senate 15:14 17:22,25 18:1 18:4,9 20:13 20:16 26:12,15 135:11,17 166:19 212:3 213:24 215:3 217:2,6 218:2 sense 14:1,1 24:23 57:18 74:12 178:13 197:8 203:5 sensitive 197:4 sent 166:14 sentence 17:25 48:13,20,24 96:24 102:8 133:15 137:6 141:14 142:2,4 144:12,14,15 144:19,22 155:10,10 175:8 222:14 222:18,21 separate 93:10 143:17 162:10 separated 163:17 165:18 165:23 separates 162:3 163:7 164:7 September 1:12 15:24 226:3 231:4	serious 84:15 served 15:7,21 16:22 17:3,9 28:11,17 serving 9:13 set 39:19,21,22 134:18 192:4 198:24 199:1 200:6,10 201:9 201:20 231:10 setting 213:14 shade 146:22 171:21 shaded 148:12 149:25 shades 171:15 197:7 shape 161:12,14 167:2 197:5 shapefile 67:5 92:9,10,17,20 shapefiles 92:15 92:25 93:8 shapes 52:20 197:7 share 23:5 36:12 36:13 shift 193:21 short 214:10 227:15 shortcoming 113:17 193:4 197:24,25 shortcomings 41:2 113:18 Shorthand 1:12 231:3,13 shoulder 161:21 show 148:25 157:11 176:7 178:3,14 180:14,18 181:5 183:20 190:15 195:8 197:6,7 209:9 showed 59:25 84:23 showing 157:5 176:17 178:9 178:20	shown 190:12 205:22 shows 76:11 108:18 112:6 112:15 141:3 186:1,3 188:18 shrunk 196:16 shy 212:4 sign 81:4 228:25 signal 159:20 significance 44:5,22 58:12 significant 160:12 significantly 112:8 similar 56:14 172:7 Similarly 135:4 135:15 simple 45:7 simply 193:6 simulations 53:8 single 92:14 112:25 162:19 195:3,15 213:15,15 sit 14:14 33:8 89:8 98:14 108:16 174:7 sitting 8:7 40:6 61:14 64:1 73:25 76:3 90:9 101:3 107:25 108:3 120:4 145:11 154:11 202:11 205:23 situation 60:3 65:25 situations 160:10 six 48:23 49:22 163:13,14 168:19 182:5 size 90:21,22 110:25 122:12 183:12 185:10 196:15 198:1,3 198:3,9,12,14	198:15,17,18 198:22,24,25 202:7 sized 196:11 sizes 199:5 skeptical 53:9 skew 218:22 skip 66:5,9 102:21 slice 51:1,2 52:1 slicing 51:3 slight 92:13 118:13 slightly 171:20 192:21 slow 114:7 small 88:7 137:18 170:13 170:21 189:10 202:2 223:9 smaller 96:6 117:24 119:6 120:12 123:17 199:7 snipped 140:5,7 social 51:19 133:5,10,16,21 134:7 socioeconomic 38:10,14,19 software 31:23 32:6 92:18 93:1 solely 55:16 somewhat 118:3 120:16 sorry 19:1 38:17 52:5 54:1 63:12 73:6 89:20 102:21 104:3 114:23 133:12 138:6 140:18 151:2 152:23 171:21 174:11 186:14 189:2 200:23 207:19 209:8 210:5 211:19 sort 96:5,10 114:1,5 134:6
--	---	--	---	---

141:13 147:8	spit 212:10,13	129:20 172:17	129:22 132:14	174:18,25
158:23 171:7,8	split 49:13,21	172:21 173:2	statistics 72:6	178:1 179:7,14
173:11,14,15	50:9 52:23	181:21 189:20	status 38:11,14	183:15 189:1
181:19 193:12	56:6 104:12	189:21 191:4	38:19 53:10	191:10 194:4
206:20 212:10	122:3 139:16	192:7 203:19	stenographica...	194:23 196:18
225:23,24	141:15 154:18	203:22 206:12	231:5	198:23 200:17
sorted 73:9	154:23 155:3	started 203:2	step 106:10	200:21 201:1,5
75:21	156:9,11,12	starting 101:17	108:19 208:16	207:24 208:11
sorting 75:12	158:3,15	101:25	210:15	208:15 228:24
sorts 109:16	160:11 161:10	starts 82:20	Stephenson	229:1,5
Soto 42:4 46:7	187:17 213:19	102:9,22,23	139:17 208:23	straight 124:1
56:24 57:23	splits 47:6,12	173:18 187:15	209:1,6,8,10	strange 51:22
58:23 179:16	49:6 52:23,24	210:20	210:7 211:4	street 2:7 8:20
179:20 216:9	92:11 153:2	state 1:7 4:10	213:5,20 214:4	8:21,23 146:16
sound 71:3,10	156:9 159:14	16:6 17:7 18:4	stepping 111:11	146:20,21,22
147:22 168:20	160:3,22 161:2	18:6,8,14	stick 86:4	146:25 147:2,5
sounds 11:5	164:16 213:24	26:11 29:18	Stone 15:5 31:16	147:14
source 39:7,9,13	splitting 187:18	46:11 47:15	37:19 38:5	Strickland
39:14 40:7,23	188:13 189:7	56:18 72:6,17	59:14,15,17	44:17
40:25 66:23	189:16,17	74:22 75:11	60:6 79:9	strike 19:1
69:3 144:10	213:25 214:4	79:2 152:20	Strach 2:6 8:13	stroke 201:15,20
sources 39:25	spoke 5:13	173:22 206:5	28:15,21 29:8	201:23,25
south 82:11	spots 150:9	212:3 213:24	30:2 35:4,13	struggling
158:20	spread 123:21	215:3 230:7	37:15 38:24	142:14
southwest 157:9	139:11 183:3	231:1	39:5,17 40:10	students 163:25
span 170:17	spring 59:19,20	State's 42:12	41:13 45:11	studied 18:13
spatial 21:8,21	SQRT 88:21	stated 47:3	48:1,21 50:18	studies 22:24
23:6 113:12	square 81:4	statement 70:4	51:17 52:11	24:23
163:24 187:17	89:12,15 90:4	74:1 120:10	53:17 54:22	study 21:22,25
spatially 113:15	119:4 124:11	121:14 132:14	55:11,18 57:14	22:23
189:9	128:25 170:18	141:19 153:12	64:21 65:2,8	stuff 20:1 32:2,8
speak 6:3	170:25	153:13 164:5	66:5,11 69:2	98:7 121:1
speaking 104:4	squared 81:6,7	174:24 188:4	69:17 70:7,16	134:1,3 146:3
119:1,14	83:7 124:5,6,7	219:23	70:24 74:3	147:10 153:20
124:10 126:20	129:1	statements	76:6,14 77:10	subcategories
127:22 128:7	squares 89:10	131:20,22	77:17 84:5,16	85:16 87:14
170:20 189:19	SS 231:1	states 1:1 20:16	90:25 106:5	subdiscipline
specific 52:5,7	ST 91:12,18,25	22:2,9 25:20	110:14 114:22	24:22
94:22 98:12,15	93:12	99:7 100:7,14	115:6,14 116:2	subdivision
98:15 102:16	stage 9:23 10:2	116:24 206:11	116:13,19	105:20
117:1 153:20	11:25 42:18	206:18 223:21	117:13 120:21	subdivisions
167:14 185:20	60:17	230:1	123:13 126:18	105:15
210:5 215:15	stand 144:22	statewide 206:3	127:16 129:25	subgroups 86:8
specifically 5:1	standard 62:9	214:22 215:1,5	143:8 145:20	86:12 117:10
20:5 37:23	63:2 128:25	215:8,12,14	146:7 155:22	subject 25:5
98:8	standing 164:5	stating 66:16	156:7 159:23	30:6 199:20
specified 231:7	start 58:21	statistic 119:4	160:6 163:19	submitted 9:22
spend 14:12	61:19 81:5	124:11 132:9	166:10 167:7	10:6,15 134:1
spent 10:1 11:15	83:6 89:20	statistical 21:21	167:18,25	submitting 55:6
12:24 107:9	96:21 112:1	22:16 129:18	168:9 171:25	Subscribed

230:14	88:10 197:19	T	121:3,4 127:12	testifying 25:14
subsequent 12:9	213:12	T 3:4 82:3	142:19 144:21	26:8 95:12
213:5	Supreme 50:21	163:21	161:9 170:21	96:3 158:5
substantial	51:18 145:7,7	T-r-e-n-d-e 4:12	175:15 179:20	159:15
62:19 175:25	145:12,15	table 68:13,17	186:17 188:1	testimony 5:5
183:2,3 202:20	162:12 167:19	73:8,16,22	189:24 192:5	27:18,25 30:6
substantially	168:3 213:5	75:10,18 76:11	203:17 211:24	45:5,13 88:13
84:24	sure 7:14 8:4	107:17,20,23	221:8 222:18	92:8,16,20
subtract 81:9	9:21 20:13	108:15,19	tallies 67:24	95:14 96:9
83:7	28:17 29:20	112:5,14 113:1	68:8,14	106:16 137:12
successively	30:16 32:16	115:1 117:9	tally 69:7 146:9	141:10 143:4
212:19	34:12 40:17	121:21,24	taught 203:25	166:25 167:5
sufficient 132:18	44:2 53:10	122:6,16	teach 25:15,16	168:12 193:12
138:13 139:4	63:1 68:2	124:21 126:1	Technical 10:17	198:16,22,24
211:25 214:15	71:25 78:12	127:12	technique	207:17,20,25
sufficiently	85:4 88:12	tabs 26:16	221:13	219:4 221:20
28:25 132:19	91:25 98:2	tabulates 68:8	tell 8:23,25	223:23 231:7
suggest 54:19	105:14 114:1	take 5:8 22:16	154:11 172:23	text 198:8,11
113:7,24	142:16 143:19	22:18 51:11	178:15 210:14	199:9
147:21	156:1 174:5	71:8 76:22,23	227:6	texts 199:12
suggested	193:12 216:4	108:19 115:11	telling 77:14	Thank 228:23
113:12 145:5	218:4 227:17	138:7 148:13	tend 64:18 65:5	Thankfully
209:6	228:14,20	153:2 166:10	123:22 186:5	83:10
suggesting 39:13	surprise 34:4,14	176:24 177:8	189:18 190:10	Thanks 97:2
74:5 95:18	35:9 36:19	185:21,22	tends 23:4	218:7
110:21 113:11	164:11	189:13 192:7	Tennessee 30:19	Theodore 2:2
168:6 191:1	surprised 35:17	193:14 197:22	term 14:2 19:22	3:3 4:6,8 10:13
196:24 197:15	surrounded	203:14 208:5	45:22 46:14	10:22 32:19
suggestion 108:8	195:16	217:13 225:14	53:9 120:25	35:18,22 41:19
147:10 191:18	surrounding	227:15	136:5,7,12	41:24 46:3
suggests 105:22	157:2	taken 1:12 22:15	153:24 167:13	57:11 66:8,12
112:11 113:16	survey 33:20,24	29:5,11 32:18	184:24 214:7	67:20 72:12
182:12	36:23 40:15	69:3 76:25	215:4,18	74:15,20 76:23
Suite 2:7,10	79:14,25 120:1	127:9 166:12	216:16,16	77:1,13,21
sum 114:20	126:13 131:8	169:12,15	terms 25:2 37:10	79:21 81:20
115:1 117:9	223:20	203:15 216:6	41:8 48:25	94:11 98:22
summarizing	surveyed 65:21	217:15 228:21	131:5 140:3,4	127:7,10
155:11	suspect 114:16	takes 147:21	194:5	130:12,15
summing 115:8	swapped 221:21	172:18 212:15	terribly 74:9	166:11,13,17
115:11	221:23	talk 4:20 20:19	test 24:18 51:25	179:9,15
supplemental	swapping	74:11 78:18	162:14 163:21	203:16 204:15
46:6 53:22	221:12,17	189:21	168:2,4,7	208:14,17,19
support 133:6,9	223:8	talked 12:2	189:25 190:2	217:16 219:14
188:8 219:23	swaps 202:8	30:24 101:7	204:3,7,9	224:25 225:6
supports 199:10	swaths 180:13	175:20 185:18	testified 4:4 15:4	225:17 226:20
suppose 24:20	switch 221:17	talking 20:23	42:9 79:7	227:5,14,20,24
70:17 84:22	sworn 4:3	58:21 69:20	90:13 127:17	228:2,5,7,11
119:11 132:12	230:14 231:4	78:6 105:17	152:9 203:18	228:18,22
140:6 142:21	symbols 196:15	118:25 119:19	227:25	229:4
supposed 81:5		120:4,5 121:1	testify 231:4	theoretically

thereabouts	113:12,25	thinks 182:13	128:25 130:8	67:1,5,6,10
226:2	116:18 117:6,8	188:16 198:4	130:17 131:11	68:9,14,21,24
thick 201:19	120:23,24	third 124:19,20	131:15 132:2	69:8 74:13
thing 12:23 15:3	121:9 123:19	197:21 222:2	ting 174:7	75:12,20 77:7
22:11 50:20	124:9 127:17	228:11	tip 139:20	78:13,18
51:8 78:22	127:22 128:7	thought 28:25	141:17	trade 184:16
88:1 117:4	128:16 129:2,7	30:13,22 101:6	titled 68:13	194:12
127:18,19	129:10 134:15	101:8 104:23	209:6 221:4	traditional
144:15 146:8	135:3 136:3	105:7 109:1,24	today 5:5 61:14	22:17,25 23:1
201:24 217:18	139:5 142:3	147:3 149:15	64:1 73:25	47:10 51:4
things 39:1 41:1	143:9 147:24	149:19 176:3	76:4 90:9	119:3
44:19 49:8	149:12,23	192:13 203:3	91:22,23 101:3	traditionally
52:18 57:18	150:23 153:24	216:13 217:19	107:25 108:3	21:25
60:21 69:19	154:1 159:12	three 21:18 30:9	114:7 145:11	transcribed
78:21 96:6	160:10 162:14	85:15 86:7	154:11 174:7	231:5
113:14,20	164:3 168:1,13	87:14 89:18,22	202:11 220:19	transcript 4:19
136:6 140:5	168:19 169:21	139:18 141:15	225:20 226:3	40:2 42:3 43:1
148:10 149:21	170:6 172:21	144:4 178:24	told 210:9	43:6,11 45:23
168:11 188:18	173:24 175:14	180:3,9,11	228:12	62:23 115:16
188:20 194:14	175:14,19,25	197:14,16,19	top 8:11 25:23	145:1 230:10
194:15 195:3	176:4,10 178:8	207:21 213:17	29:16 153:1,7	230:11 231:6,7
197:7 199:4	179:1,5,6	220:17	153:14,24	transcripts
222:3	180:13,18,19	threshold 44:20	154:12 160:21	229:2
think 7:15 8:14	182:5,11	58:12 134:16	161:1,5,9	transferred
11:12 12:6,17	183:10 184:7	138:16,20	201:3,4,9	210:13
12:23 14:2,10	185:3,8 186:7	162:9 191:16	topic 20:8 76:20	transform
15:3,12 16:24	188:18,19	212:3,21 216:4	113:24 114:5	181:18
16:24 21:10	189:2 191:24	216:12	217:10	transmit 10:9
25:6,23 27:5,8	192:25 193:6	thumb 190:23	topics 25:12	41:20 57:7
27:22 29:15,20	193:10 194:7	191:3 203:21	total 73:9,17,19	74:15 98:18
29:23 30:25	194:24 195:1	203:24 204:2,4	75:13 80:7,24	219:10
32:5,15 34:3	195:21,22	tibble 212:17	81:2,10 83:9	transmitted
37:2,9,10,18	196:21,22	tidycensus 69:10	83:13 85:8	79:18 179:5
37:20 41:15	197:21 199:6	70:9,12,14	89:6 96:24	transparency
43:21 44:12	200:1 202:16	71:18 74:7	97:3 99:8,9	200:5
45:5 47:8	202:18,25	76:9,12,13	111:18 122:9	transparent
48:25 51:19	203:9,22	78:7	122:16,19	200:11,16
52:4,13,14,15	204:12 206:21	time 7:5 9:14	124:3 138:19	traverse 49:20
53:9,24 54:10	207:16 208:2	11:9 12:24	222:21	treat 22:6
55:7,12,19,25	211:8 213:7	14:13 22:19	totaling 97:9	treated 43:15
57:8 59:24	215:2,16	43:7 44:21	Totally 114:5	trend 21:4
61:14 63:4,22	216:15,24	55:22 60:6,22	touch 12:15,18	Trende 1:11 3:2
74:9 76:9 79:6	217:13 219:11	61:1,7,15	toy 207:1	4:1,7,12 32:20
79:11 85:1	219:21 220:16	76:21 79:7	tracking 176:15	35:23 44:24
86:22 87:24	221:19 222:20	107:10 132:24	tracks 155:13	48:20 50:11
88:9 90:3 95:6	223:22 225:3	132:24 196:6	166:3 176:8	63:15 66:13
97:20,22,22,24	226:12,20	220:7 227:8	tract 67:11	77:14,22 86:2
98:7 106:16	229:5	228:13 231:7	69:16 75:5,17	128:12,20
108:7,24	thinking 13:25	times 4:15 119:4	75:23 76:1,4	179:16 193:11
110:10 112:20	140:3,4	124:6,11	tracts 66:17,20	197:16 198:16

217:17 225:1,9 225:18 228:3 228:23 231:3 trends 18:14,20 18:23 19:5 20:23 trial 61:3 trick 183:18 tricky 50:20 51:7 176:1 215:2 tried 51:1 167:21 190:15 trier 168:15 trigger 160:12 trillions 223:20 true 24:20 30:16 34:25 35:1,7 39:1,4,9 45:1 45:10 58:24 59:1 62:10 64:20 65:4 83:22 91:22,23 95:23 112:10 115:5,18,25 116:1 118:6,11 119:18 123:7 125:11 126:15 126:17 129:15 129:18,19,22 129:23 130:4,5 130:7,10,21,23 130:24 131:2 131:10,10,14 131:21 132:3,8 132:15,20,25 133:2 138:18 142:21 144:2 151:15 156:20 177:13 180:23 181:6,10 184:12 187:2 189:23 192:8 192:15 205:21 205:22 214:6 218:16 230:11 231:6 truly 22:10 truncate 148:4 truncated	150:11 152:15 truncates 148:4 truncating 152:7 trust 93:6 147:19 trusting 133:14 truth 231:4 truthful 5:5 45:5 try 4:20 21:14 49:15 62:24 114:24 138:21 163:21 trying 48:19 49:8,24 50:4 74:12 122:11 131:20 133:25 137:21 142:7,9 173:7 203:7,12 207:8 210:15 turn 31:17 36:7 42:25 59:5 66:3 80:9 86:2 88:15 96:19 99:3 107:12,13 140:13 152:17 154:16 157:13 162:1 171:2 186:13,14 206:7 209:3 211:20 turned 81:24 turning 174:1 turnout 18:15 19:14 twice 182:19 183:7,12 185:9 192:9 two 6:9 15:18 27:1 83:14 94:21 98:6 124:13 128:25 139:20 140:9 141:17 142:10 144:5 163:12 181:8 182:17 182:21 184:15 186:3 191:6 213:16 218:5 twofold 124:13	type 72:25 75:5 78:22 106:7 131:23 160:12 187:13 189:6 189:11,21 190:5,24 193:7 typical 171:18 typically 18:5,7 22:11 74:6 199:16 <hr/> U U.S 18:1,1 21:22 23:19 145:6,7 145:12,15 ultimate 83:11 90:15 95:11 96:9 107:8 158:6 168:12 ultimately 117:18 168:14 Um-hm 184:9 unclear 62:14 underlying 146:20 147:11 understand 4:24 9:5 19:22 26:15 50:4 61:18,20 62:11 62:20 68:7 71:6 74:10 84:7 86:5 100:7 120:10 120:24 121:24 139:17 142:14 143:10,15 144:10 153:10 154:2 166:1,5 167:19 178:6 180:21 188:23 189:2 200:23 207:10 213:19 217:11 221:8 222:11 225:13 225:25 227:17 understanding 7:21 26:13 42:16 58:20 64:2 67:8 78:21 114:12	147:7 153:18 154:9 168:3 178:18 195:25 213:8,10,13 214:7,21 215:18,23,24 215:25 216:5 219:7 221:24 221:25 understood 34:12,18 unfair 137:18 139:6 203:4 ungainly 51:22 uninhibited 158:17 United 1:1 20:16 116:24 223:21 230:1 units 22:1,4,6 170:13,21 unknown 109:18 113:11 unknowns 109:18 113:11 unquote 212:19 212:22 unreliable 37:11 54:20 55:10 57:12 84:4 updates 14:25 urban 117:3 205:8 urgency 96:5 URL 220:20,23 usage 20:22 use 24:5 27:10 27:17 31:24 32:6 40:14 45:22 46:14 52:6 57:18 62:9 63:2 80:16 84:19 85:25 87:13,21 88:10 103:16 105:19 108:20 109:2,25 110:4 110:20 111:20 142:18 146:1 147:14,16	150:8 168:23 169:18,23 170:11 175:12 178:2 179:8,10 180:22 187:16 194:7 196:8,9 196:23 197:16 198:2,12 199:13 205:19 207:10,14,18 207:21 208:2 215:1,2,12,14 useful 36:13 190:24 uses 41:11 69:10 148:21 196:1 199:23 202:7 206:1 221:17 usually 19:24 162:14 183:18 183:19 utility 178:3 utilized 169:2 <hr/> V v 15:5,6 16:25 26:23 27:3,5 30:14,18,21 31:6,8,9,10,11 31:12,13,15,16 44:17,18 59:14 160:7 185:3 vagaries 34:11 vain 146:2 validate 108:11 188:24 validated 188:4 value 73:16 129:19,24 130:4,5,10,21 130:23,24 131:3,21,24 132:4,9,15,18 132:20 133:1,2 189:24 200:7 200:11,25 201:15,20 values 22:13 129:13,14 130:7,17,20
--	--	---	---	--

Vance 8:2 138:24 139:3,7 139:21 141:12 141:18 143:3 144:1,5 160:22 161:2,3,5 162:4,11,21 163:2,8,9 164:12,16,22 167:2,17	44:19 47:4 50:4,17 53:14 57:12,15 58:13 58:14,20 60:2 105:21 131:2 138:3 145:7 151:18 160:2 161:4 176:14 182:8,14 190:12,12 191:23 192:25 193:8 194:9,17 194:20 195:23	137:1 138:8 139:4 152:21 155:17,21 162:21 163:3 164:6,12 169:19 174:3 174:12,13,23 175:1,2,9,10 175:15 176:19 176:20,22 177:1,10,16,17 213:13 214:9 215:19 216:17	warning 38:8 Washington 2:3 42:5,12 46:12 139:18 141:12 141:16 143:3 144:1,4 209:21 209:24 210:22 211:1 washy 51:19 wasn't 27:6 30:5 42:15 50:8 58:2 60:14,18 60:19 85:2 98:16 105:13 109:22 161:8 185:17 223:4 waste 153:19 watched 133:25 way 11:20,24 24:11,24 29:17 31:3 32:12 35:17 36:20 41:14 46:18 52:1,3,22 58:2 58:18 62:22 76:17 94:4 95:5 100:23 105:6,10,12,13 106:1,9,15,17 107:5,24 108:2 108:5,10,16 109:1,1,3,4,10 110:1,3,17,21 110:22 118:6 118:10 125:15 128:1 135:13 135:19 138:22 140:5 143:24 144:3 146:10 149:5 155:24 158:14 160:12 161:8 163:25 164:16 167:5 180:9,12 184:4 189:18 193:12 197:14,16,19 199:10 207:9 208:2,9 226:12 228:15 ways 25:8 49:16	53:5 57:17 98:6 110:15 120:24 207:7 208:1,7 we'll 86:2 229:7 we're 69:19 114:1 117:18 121:9 219:11 weak 187:16 website 67:24 72:7,16 75:12 75:14 78:11,14 weeds 109:16 weight 207:5,11 207:12,13 weighting 207:17 223:14 weird 167:10 welcome 188:17 went 82:11 85:1 weren't 60:15,15 151:5 195:19 west 158:21 western 42:4 139:20 141:17 whatnot 74:11 WHEREOF 231:10 whichever 156:10,12 white 38:16,17 38:22 62:1 85:16 89:19 90:1,6 149:25 150:9 162:4,11 162:17,17 163:3,7,9 164:8,12 165:12,16,21 169:23,24 172:24 173:12 173:15,23 175:10 176:22 177:14,17,20 178:12,17 180:2,24 181:4 181:9 182:19 182:22 183:11 183:13 185:9 185:11 186:2
VAP 34:10,21 36:13 51:14 60:7 174:10 175:18 207:10 207:22 VAPs 60:2 variability 35:16 variance 116:5,7 116:10,16,21 117:19 118:14 118:16,17,20 119:5,10 123:15,19,20 123:23 124:8 124:11,15,17 125:12,16 126:4,10,19,21 129:2 215:4 variances 127:1 127:5 variety 34:21 various 26:13 53:5 verified 78:23 verify 78:7 118:23 120:17 121:14 147:12 161:23 version 137:19 196:1 202:6,21 versus 17:2 27:23 28:7 42:4 59:15,18 77:7,8 79:9 117:3 128:3 151:3,9 182:10 194:10 videoconference 1:11 2:2,6,9 view 19:23,25	Vincent 1:12 231:3,12 violate 139:17 213:19 violation 42:13 Virginia 185:4 216:11 Virginia's 36:5 vis-a-vis 193:9 vision 171:19 visualization 183:17,19 188:22 visualizing 194:5 visually 182:18 vote 23:5 71:11 voter 18:15 19:14 voters 142:20 176:25 177:9 177:14,14,15 214:15 votes 214:15 voting 16:6 18:16 19:17 23:22 24:1,5,9 24:15 25:4,15 25:16,20,21 29:13 33:10 34:6,16,22,24 35:2,3,10,12 42:13 43:17 44:25 62:6 63:3 64:12,19 65:6,16,24 80:7,7 87:15	VRA 16:3,4,5,6 16:7,10 29:6 30:10,15,20,22 40:14 42:14 214:17 vs 1:6 230:6 <hr/> W wait 4:21 100:3 Wake 73:14 walk 37:22 want 5:7 38:18 40:3 72:22 74:4 76:8,17 86:4 88:15 102:21 106:7 108:9 110:15 111:13 118:22 120:10 121:13 124:19 127:12 128:23 141:13 152:17 154:16 163:12 166:21 168:18 169:17 180:21 181:19 184:5 185:7 188:23 193:11 203:17 217:17 223:25 225:13 225:15 226:15 227:15 wanted 11:11 43:19,22 44:5 58:17 142:10 156:2 wants 147:21 war 61:4	warning 38:8 Washington 2:3 42:5,12 46:12 139:18 141:12 141:16 143:3 144:1,4 209:21 209:24 210:22 211:1 washy 51:19 wasn't 27:6 30:5 42:15 50:8 58:2 60:14,18 60:19 85:2 98:16 105:13 109:22 161:8 185:17 223:4 waste 153:19 watched 133:25 way 11:20,24 24:11,24 29:17 31:3 32:12 35:17 36:20 41:14 46:18 52:1,3,22 58:2 58:18 62:22 76:17 94:4 95:5 100:23 105:6,10,12,13 106:1,9,15,17 107:5,24 108:2 108:5,10,16 109:1,1,3,4,10 110:1,3,17,21 110:22 118:6 118:10 125:15 128:1 135:13 135:19 138:22 140:5 143:24 144:3 146:10 149:5 155:24 158:14 160:12 161:8 163:25 164:16 167:5 180:9,12 184:4 189:18 193:12 197:14,16,19 199:10 207:9 208:2,9 226:12 228:15 ways 25:8 49:16	53:5 57:17 98:6 110:15 120:24 207:7 208:1,7 we'll 86:2 229:7 we're 69:19 114:1 117:18 121:9 219:11 weak 187:16 website 67:24 72:7,16 75:12 75:14 78:11,14 weeds 109:16 weight 207:5,11 207:12,13 weighting 207:17 223:14 weird 167:10 welcome 188:17 went 82:11 85:1 weren't 60:15,15 151:5 195:19 west 158:21 western 42:4 139:20 141:17 whatnot 74:11 WHEREOF 231:10 whichever 156:10,12 white 38:16,17 38:22 62:1 85:16 89:19 90:1,6 149:25 150:9 162:4,11 162:17,17 163:3,7,9 164:8,12 165:12,16,21 169:23,24 172:24 173:12 173:15,23 175:10 176:22 177:14,17,20 178:12,17 180:2,24 181:4 181:9 182:19 182:22 183:11 183:13 185:9 185:11 186:2

187:6 188:14 191:6,7 192:10 193:9 194:10 194:20 195:8 196:9 197:2,10 197:10,20 199:23 200:6 200:15,19 201:8,12,21 202:19 203:3,8 205:2,2,15,16 214:15 whitest 155:5 wife 6:5 wiggle 82:10 119:12 Wikipedia 147:8 147:9 Williams 206:1 206:4 217:20 Williamson 196:4 win 216:19 winding 186:4 window 6:12 Wisconsin 61:4 wish 194:7 wishy 51:19 withdrew 153:10,18 witness 10:19 14:19 17:20 24:20 36:8 43:2 74:19 75:8 80:11 82:17 86:24 88:17 94:19 96:20 99:4 100:12 103:10 107:14 114:11 117:22 140:16 154:17 158:8 160:15 162:2 171:4 179:13 186:16 202:5 206:8 209:5 211:21 221:3 224:18 227:10 231:7,10 witnesses 225:8	word 22:5 49:12 71:8 144:18 words 111:24 112:2 wordsmithed 137:5 141:21 142:17 169:14 wordsmithing 218:18 work 11:12,20 11:24 12:13,15 12:18 13:18 23:13,15 24:1 24:5,8 25:5,17 27:14 29:6,6 29:13,21,25 32:7,21,25 33:15 40:21 84:11 110:3 121:13 126:23 131:1 133:9 139:24 142:7 164:4 188:3,23 191:4 204:3,7 204:9 208:20 214:17 216:7 225:10 worked 84:8 88:7 207:3 working 11:7 31:24 189:22 works 180:22 193:13 207:9 229:5 world 58:11 worse 53:13 84:22 188:20 202:16 223:11 wouldn't 24:23 29:15 34:2,19 35:17 36:19 95:16 96:9 105:9 113:15 138:11 143:4 147:16 151:7 160:12 177:6 178:19 187:9 190:15 194:17 196:17 201:2 216:18 218:22	wrapped 61:2 wrapping 114:3 write 12:16 14:9 25:17 60:24 144:24 writing 20:1 22:15 87:9 141:20 written 18:13 20:4 144:2 wrong 44:13 69:1,6,12,13 69:14,16 70:6 70:13,22 76:9 76:12,13 84:1 84:4,6,10,17 99:13,16,20 113:15 147:11 148:10 152:2 173:24 180:18 199:3,8 206:21 206:24 209:22 219:9 221:25 wrote 12:14 31:18 35:24 36:4 84:8 85:18 141:14	y-hat 124:7 Yakama 47:13 49:9,10,14,17 49:19 51:9 yeah 4:12 7:14 30:3,14,18,25 32:2 35:15 37:9 42:15,24 43:10,21 45:13 59:4 60:14 63:4 64:10,15 69:18,20 70:12 72:21 73:21 76:23 79:11 82:5,23,24 83:14,15,20,25 84:6 85:13 86:9 87:11 97:15,20 98:6 104:4,23 105:4 105:7 112:11 116:15 120:23 125:12 128:16 129:7 133:16 135:3 137:4 140:20,25 141:21 147:7 149:5,9,12 150:1,3 151:16 156:10 158:19 161:12 162:8 169:14 170:23 172:11 173:13 173:17,24 177:15 178:24 180:5,5 182:8 182:24 184:1 184:13 187:11 191:3 196:16 197:3 199:19 201:23 202:10 203:2,21 204:24 205:4,7 205:17 207:3 209:8 210:11 211:8 214:18 215:22 218:4 218:17,23 220:2 223:3,22 226:4	year 54:8 58:20 years 16:17 26:11 yell 198:2 yellow 148:1,13 148:14 149:1,2 165:8,22 York 15:18,19 147:15
<hr/>				
Z				
<hr/>				
Z 119:4 124:11				
zero 34:10				
125:15 138:25				
148:15 149:2				
201:25				
zigzags 158:17				
Zoom 4:17 6:12				
158:13 179:14				
zoomed 205:10				
<hr/>				
0				
<hr/>				
0 150:13,24				
0.1 198:9				
<hr/>				
1				
<hr/>				
1 3:6 10:10,11				
14:17 17:18				
30:1 31:4 44:3				
44:15,18,20				
45:3,15,16,21				
52:5 55:15				
56:2 57:6				
58:11,12 59:5				
60:2,3,9,16				
82:25 83:3				
87:2 96:9				
124:2 132:18				
135:12 137:11				
137:20,24				
138:4,14 139:4				
139:10 157:17				
157:17 158:15				
160:4 165:9				
178:6 182:15				
198:9				
1,000 172:18				
1,776 67:6 68:23				
1.3 85:1				
1.8 85:1,1				

1:25 1:13	15 3:14 26:11	2.1 99:19	23 46:7 96:19,21	160:14
10 3:6,11 81:17	54:4 121:21	20 114:19,21	99:19 102:20	36 100:11
81:18 82:16	181:9 182:22	138:23,23	102:22 168:20	37 68:17 69:23
88:15 97:14,15	183:7 186:2	168:20 177:5	237.45 124:25	162:24 164:7
115:18 116:23	187:11 191:6	187:11	24 59:21 96:19	371399606001
117:16 150:25	194:21,24	200 2:10 20:21	99:24 100:3,25	95:15 96:17
157:11,14	213:24 219:11	2000 221:11,24	102:23 133:4	371399607012
168:20 169:19	219:12,15	20001-3743 2:3	133:15 181:9	96:17
169:24 173:9	15-minute	2001 6:23	25 136:21 148:7	38 162:1,8,20
174:2,3 175:9	217:14	2010 222:7,21	148:12 209:3	39 162:8
175:10 180:23	16 10:7 168:20	222:25	213:18	39.9 149:8
181:11 182:2,6	171:2,5 187:13	2011 6:18	251 179:16	
187:10,12	202:7,18	2012 21:3	2600 69:20	4
216:20	166 3:12	2014 20:10	27 146:12	4 3:3,8 45:25
10,000 160:21	169225 96:25	2016 54:17	150:10 152:8	46:1 75:7
161:24	97:1	2019 37:17	166:22 167:3,4	132:13
10,439,388 71:7	17 43:15 54:15	2020 19:1,3 35:8	169:1,11	4,000 69:21
71:9	56:22 155:8	36:23 37:2,7	173:21 174:24	4,967 70:2,5
100 62:17 130:6	156:20 168:20	37:13,25 38:2	175:11 186:13	4.3 54:2,3
130:8,17,22	172:12 173:11	38:7 40:8 54:5	27603 2:7	4.4 112:17
131:7,11,15	182:12 184:7	54:14,16,17,21	28 89:2 152:17	4:23-CV-0019...
132:2 150:13	186:14 206:7	55:20 67:7,10	152:17 174:1	1:2 230:2
158:11 172:18	206:13	68:13 71:7	290 125:3	40 125:16
195:13 196:4	170 226:8	83:19 100:1		149:10 150:15
217:20	174 122:25	102:9,11,17,19	3	150:19
11 3:11 94:8,9	1776 78:12	102:23 218:9	3 3:7 41:21,22	41 3:7 211:20
94:18 187:12	179 3:13	218:16,25	121:21 124:21	42 164:11 211:3
11,000 152:25	18 54:14 99:3	219:4,24 222:1	126:1 205:9	43 209:3
153:21 154:6	117:21,23	222:13	222:6	43215 2:10
12 3:12 98:19,20	120:11 218:8	2021 36:5 54:5,8	3,000 116:24	44.99 149:11
140:15	219:23 220:13	54:9,13,14	30 1:12 148:2,5	440 138:6
1200 2:10 71:1	220:24	55:20	148:15,18,24	46 3:8
1240 138:6	19 36:24 43:15	2022 19:4 23:18	150:11 152:7	48 14:16
13 3:12 53:21	54:14	83:19 97:21	152:15 189:20	49 59:6
54:1 107:13	1998 6:23	100:1 101:1,11	190:21 191:1,8	49.5 102:11
166:14,15		101:17 102:1,6	191:16 203:19	131:14,16
168:20	2	2023 9:24 60:10	231:4	4th 145:24
13,967 71:14,22	2 3:7 21:17 28:3	134:19 135:17	301 2:7	
74:2	35:19,20 42:13	166:18	305 122:22	5
1300 71:2	46:23,23 72:22	2024 1:13 10:7	30th 226:1,3	5 3:8,13 57:8,9
14 3:13 158:7	75:3 107:18	10:15,23 11:4	31 11:3	66:5 76:24
180:24 181:4	112:5,14 113:1	42:7 46:7	32 148:18	88:16 172:19
181:23 182:22	115:1 117:9	59:20 61:10,15	179:23	172:19 179:7
183:8 186:1,2	127:12 129:1	230:15 231:4	33 114:10 171:3	179:10,11
191:7 204:12	135:12 221:1	204 3:13	172:6 183:20	180:24 181:4
204:13	2,102 70:19	21 164:15 165:8	34 154:16	181:23 198:3
14,610 75:18	2,364 136:25	210:20	172:13 183:20	200:11 201:9
1400 2:7	138:7	219 3:14	34,130 75:23	202:13 217:2
1468 71:3,10	2,672 68:21	219.45 125:6	35 3:7 99:6	228:18
14th 17:8 29:19	74:25	22 202:4 210:19	148:24 149:2,8	5,878 67:12

5:16 229:8	6	210:23,23		
50 11:17 43:17	6 3:9 53:24 66:3	211:1		
43:23 44:1,4,6	66:13 67:17,18	90 132:1,2,13,17		
44:9,12,15,18	68:11,23 70:1	132:23,24		
44:20 45:1,3,9	70:19 78:6	133:18 134:3		
45:14,21 50:1	80:14 88:2	151:9		
50:2,15 51:14	96:13 124:2	94 3:11		
52:4 55:15,25	60 140:13,18	95 34:10 133:6		
56:2,4 57:20	150:15,19	133:10,17,19		
58:4,8,12 60:2	157:13	133:22 134:2,8		
60:7 84:21	601 2:3	151:13		
85:25 96:8	63 162:20 164:6	965 122:19		
102:10,18	64 80:9	98 3:12 166:5		
103:13 107:8	67 3:9			
129:12,14,18	7			
129:22,24	7 3:9 72:9,10			
130:17,20,21	101:10 124:9			
130:22,23	186:15			
131:8,12,13,15	7,111 69:24			
131:16 132:15	70:23,25 71:9			
132:16,21	72:19,20 73:1			
137:11,20,24	70 138:11 148:5			
138:4,14 139:4	150:12 151:12			
139:10,20	152:7,15			
140:12,24	158:10 164:20			
141:5,17	700 125:16			
142:24 144:3	72 3:9 112:22			
151:3 154:19	74 3:10			
158:25 160:4	75 151:9			
212:5,22	77,599 152:22			
214:10	77,699 152:20			
50.1 133:3	79 3:10			
50.14 101:12,14	8			
101:20,23	8 3:10 36:7 42:7			
102:4,7	74:17 79:14,24			
50.19 103:3,8	105:17 109:14			
50.2 102:10	146:11 149:24			
50.3 54:5 55:20	150:5			
50.5 131:6,11,13	8,962 73:15,16			
132:11	81 3:11			
50.9 133:3	83,992 97:4			
51 59:7	87 42:25			
51.1 54:4 55:19	890 122:9,16			
51.47 138:1	9			
525 124:21	9 3:10 79:18,19			
538 131:4	86:22 133:4,15			
55 151:3	187:12 210:22			
57 3:8				
58 137:16				
59 86:23				